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ABSTRACT

This handbook provides a description of the national and Texas initiatives for building a world-class competitive work force using education and training programs that are driven by industry via the National Skills Standards, SCANS (the Secretary of Labor's Commission on Achieving Necessary Skills), and the Texas Skill Standards and Certification Projects. It was developed as part of the Education 2000 initiative to make the U.S. work force competitive in a world economy by upgrading basic and technical skills. The handbook describes the procedures for the development and the potential uses of a SCANS Occupational Profile. The handbook also presents other occupational profiles for electrical engineering technicians that will be of value in restructuring and enhancing the technical curriculum through the integration or inclusion of the SCANS skills and the National Skill Standards into existing technical curricula. Each of the occupational profiles contains task analysis sheets that include the following: occupation, duty area, competency, technology performance skills (tasks), tools and equipment needed, communication skills, mathematics skills, reasoning skills, and SCANS resources, information, and skills required. (KC)

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SCANS OCCUPATIONAL PROFILE HANDBOOK
for
ELECTRICAL ENGINEERING TECHNICIANS

TEXAS SKILLS STANDARDS AND CERTIFICATION PROJECT

by

TEXAS INSTRUMENTS

and

The University of North Texas

with support from

THE ELECTRONICS INDUSTRY FOUNDATION

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Prepared by:

Dr. Bill E. Lovelace
Dr. Jessie Teddlie

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Tri-Agency Project Advisor: David Dennis

Project Staff:

Bidder: Texas Instruments
Wayne Freeland

Co-Bidder: Electronic Industry Foundation
Molly Mannon

University of North Texas

Project Director: Jessie Teddlie
Contract Administrator: Suzzane La Brecque
Assistant Project Director: Bill E. Lovelace
Research Assistants: Paige Parsons
Hershel Strickland

Texas Instruments: Marcy Hart
Abby Ray

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PREFACE

The ***SCANS OCCUPATIONAL PROFILE HANDBOOK FOR ELECTRICAL ENGINEERING TECHNICIANS*** provides a description of the national and Texas initiative for building a world class competitive work force using education and training programs that are driven by industry via *National Skill Standards* and *SCANS* and the *Texas Skill Standards and Certification Projects.*

The **Handbook** describes the procedures for developing and the potential uses of a **SCANS Occupational Profile.** The **Handbook** also presents other occupational profiles for the electrical engineering technician that will be of value in restructuring and/or enhancing the technical curriculum through the integration or inclusion of the SCANS skills and the National Skill Standards into the existing technical curricula.

The ***SCANS OCCUPATIONAL PROFILE HANDBOOK*** is one of four SCANS Occupational Profile Handbooks resulting from the *Texas Skill Standards and Certification Projects.*

With the partnership of Texas' business, labor, industry, and education, the **Tri-Agency Partnership** is committed to continue its efforts to build a Texas world class work force.

David Dennis
Texas Department of Commerce

■ Background:

The report, **BUILDING A QUALITY WORKFORCE**, states that ***"Our nation is experiencing a widening gap between workplace needs and workplace capabilities, and we need to address this mismatch between the needs of business and the skills of young people leaving our schools."*** Since the dissemination of **BUILDING A QUALITY WORKFORCE** in 1988 which was a joint initiative of the U.S. Department of Labor, U.S. Department of Education, and the U.S. Department of Commerce, several reports and congressional Acts have occurred that are anticipated to close the ***"gap"*** and keep our nation competitive in a global economy.

In the major study, **WORKFORCE 2000, WORK AND WORKERS FOR THE 21ST CENTURY**, conducted jointly by the Hudson Institute and the Department of Labor, the following statement was made:

> ***"When jobs are given numerical ratings according to the math, language and reasoning skills they require, only 27 percent of all new jobs fall into the lowest two skill categories, while 40 percent of current jobs require these limited skills. By contrast, 41 percent of new jobs are in the three highest skill groups, compared to only 24 percent of current jobs."***

The implication? The current curricula of our educational institutions that are preparing students for the work force **do not include the increasing educational and skill requirements** of the workplace. The **WORKFORCE 2000** report stated:

> ***". . . Education levels, of course, are only a rough proxy for the skills required for employment. But more detailed analysis of the language, math and reasoning skills required for various jobs reinforces the conclusion that the skill mix of the U.S. economy will rise substantially between now and the end of the century . . . ."***

President George Bush released **AMERICA 2000: An Education Strategy** on April 18, 1991. **"America 2000"** has been referred to as ***"a bold, complex, and long-range plan to move every community in America toward the national education goals adopted by the President and the governors last year [1990]."*** The **"America 2000"** strategy includes four parts. In **Part III. For the Rest of Us (yesterday's students/today's work force): A Nation of Students** it is specifically proposed that: "*Business and labor will be asked to adopt a strategy to establish job-related (and industry specific) skill standards, built around core proficiencies, and to develop 'skill certificates' to accompany these standards.*" It is proposed in this strategy that such efforts be informed of the work of the Department of Labor's **Commission on Work-Based Learning** and the **Secretary's Commission on Achieving Necessary Skills.**

> "The term 'skill certificate' means a portable, industry-recognized credential issued by a School-to-Work Opportunities program under an approved State plan, that certifies that a student has mastered skills at levels that are at least as challenging as skill standards endorsed by the National Skill Standards Board established under the National Skill Standards Act of 1994, except that until such skill standards are developed, the term 'skill certificate' means a credential issued under a process described in the approved State plan."
>
> CONFERENCE REPORT
> [To accompany H.R.2884]

As a result of the need for our nation to be competitive in a world economy and the rapid increase of technology on the job, the **Secretary's Commission on Achieving Necessary Skills (SCANS)** was asked to identify the **requirements of the workplace for entry level employees.** Specifically, the Commission was asked to:

- **Define the skills needed for employment;**
- **Propose acceptable levels of proficiency;**
- **Suggest effective ways to assess proficiency; and**
- **Develop a dissemination strategy for the nation's schools, businesses, and homes.**

In the "*Executive Summary*" of WHAT WORK REQUIRES OF SCHOOLS, A SCANS REPORT FOR AMERICA 2000, it is stated:

> "*SCANS research verifies that what we call 'workplace know-how' defines effective job performance today. This know-know has two elements: 'competencies' and a 'foundation' . . . . Thus, the competencies and foundations should be taught and understood in an integrated fashion that reflects the workplace 'contexts' in which they are applied.*"
>
> "*The competencies differ from a persons technical knowledge. For example, both accountants and engineers manage resources, information, systems, and technology. They require competence in these areas even though building a bridge has little to do with balancing a set of books.*"

Congress, in framing Public Law 101-392 (Perkins Amendments 1990), being aware that the requirements of the workplace must be the base for developing instructional content for preparing competent, entry level workers included "*Section 416. Development of Business and Education Standards*" in the Act. **Section 416** states:

> "*(2) The committees established with assistance under this section shall propose national standards for competencies in industries and trades. Such standards shall at least include standards for -*
>
> *(A) major divisions or specialty areas identified within occupations studies;*
>
> *(B) minimum hours of study to be competent in such divisions or specialty areas;*
>
> *(C) minimum tools and equipment required in such divisions or specialty areas;*
>
> *(D) minimum qualifications for instructional staff; and*
>
> *(E) minimum tasks to be included in any course of study purporting to prepare individuals for work in such divisions or specialty areas.*"

More than twenty "*National Skills Standards*" projects are being conducted under the provisions of Section 416 of Public Law 101-392. The **Electronic Industries**

Foundation of Washington, D.C. is conducting a project to develop or identify national skills standards for entry level electrical engineering technicians.

In Texas, the **Texas Department of Commerce** took an early lead of promoting an **industry driven skill standards and certification system** as a key strategy for assisting Texas in building a world competitive work force. In the ***"Preface"*** of the report to the Governor of the **TEXAS SKILLS DEVELOPMENT PROGRAM,** Barbara Cigarnaro stated:

> ***"Acknowledgement of Texas' business and industry concerns has caused our current research to delve into methods and strategies that would connect the foundation skills with occupational-technical skills. The challenge ahead is to integrate academic and vocational-technical training, establish clear career path options and develop a work force preparation system that meets employers' needs."***

> "High-performance workplaces . . . require . . . the ability to manage resources, to work amicably and productively with others, to acquire and use information, to master complex systems, and to work with a variety of technologies."
>
> LEARNING A LIVING: A Blueprint for High Performance

One of the strategies being used to connect the foundation skills with occupational-technical skills is the funding of four ***Skill Standards and Certification Projects*** in Texas. The **purpose** of the first year of the stated projects is ***"to build a viable method for integrating SCANS skills into the technical training curricula in Texas so that students will be able to apply SCANS skills along with state-of-the-art technical skills."***

This project will assist in bringing about a needed systemwide **reform of public educational institutions who have a responsibility** for assisting in developing a quality work force that is competitive in a global economy. Statewide reforms include five key components: **1) Skills Standards (including SCANS) by occupations identified and/or validated by the workplace; 2) curricula developed based on the skills standards; 3) high**

quality instructional materials, facilities, and equipment; 4) faculty highly qualified by subject mastery and professional development; and 5) student assessments in formative and summative modes and tied to the workplace requirements via the curriculum.

■ Concerns and Issues:

A review of the literature reveals that as with other reform movements or efforts to improve education and ultimately the national workforce, confusion occurs due to a lack of common terminology. Common or core terms of references and understandings are imperative if the skills standards and certification initiatives are to be successful.

Following are examples of terminology issues that have surfaced during the research performed prior to the preparation of this Handbook:

- certification: maybe used to recognize or document that an individual has completed or achieved the requirements of an activity or objective with established minimum requirements and is awarded by the entity establishing the requirements for the certificate. **Certification** is usually performed by voluntary or non-governmental agencies. **Certification** is sometimes used instead of licensure by governmental agencies such as teacher certification.

- curriculum: referred to as a systematic group of courses or sequences of courses required for graduation or certification for a career objective. **Curriculum** is sometimes used to mean the instructional content of a subject area.

- job: the word ***"job"*** had different meanings depending on when, how, or by whom it is used. **Job** is often used interchangeably with the words "*occupation*", "*position*", "*function*", and "*task*".

- Skill: is referring to the ability to perform a mental or psychomotor performance. The terms "*skill*" and "*ability*" are used synonymously. The terms "*task*", "*operation*", and "*competency*" are sometimes used as being synonymous with the word "*skill*".

- occupational analysis: the terms "*job analysis*", "*task analysis*", and "*work analysis*" are often used synonymously.

- **outcome:** something that follows as a result or consequence. A change in behavior is an **outcome** which could be positive or negative. In education and training, **outcomes** should be stated in performance terms.

- **performance:** the execution of an action

- **performance test:** used narrowly to refer to the demonstration of ability and used broadly when referring to any type of psychomotor assessment.

- **standard:** defined in PL 101-392 as the level or rate of an outcome. The word is used correctly in terms of institutional standards, industry standards, and program standards when reference is used in relation to minimum requirements of knowledge, skills, and attitudes that must be demonstrated or performed.

  The word **standard** is also used correctly when it is used to describe the level or degree of an established measure.

- **standard, Job-Related Industry Skill:** defined by the U.S. Departments of Labor and Education in 1992 as "*Generally, is the identification of knowledge, skill, and level of ability needed to satisfactorily perform a given job.*"

- **skill standards:** referenced above as "*job-related industry skill*"; used synonymously by educators and trainers as workplace requirements, competencies, and outcomes of technical and vocational education.

■ Job Analysis

Job analyses are the basic processes for obtaining information needed for the development of the instructional content of curricula designed to prepare individuals for entry level employment in an occupation (a cluster of jobs) or cluster of occupations. Information obtained from a job analysis may also be used for:

- **developing job descriptions;**
- **creating and maintaining job selection and promotion systems;**
- **establishing job classifications and pay scales;**

- **conducting employee evaluations of job performance in terms of productivity (efficiency and effectiveness).**

A review of the literature reveals that these are several job analysis techniques that have a series of specified procedures for obtaining and analyzing information about specific jobs. Specific job analysis techniques that have been recognized nationally as proven systems include: Functional Job Analysis ; Critical Incident Technique; Position Analysis Questionnaire; Job Element Analysis; CODAP Task Inventory Analysis; and DACUM. A review of the task inventories developed using CODAP revealed that the five competencies developed by SCANS have been included in the task inventories for years. Also American College Testing (ACT) has developed a "*Job Profiling Technique*" for "*Work Keys*".

According to literature disseminated by ACT: "*The Work Keys System has two fundamental tasks: (1) to build a metric that will measure an individual's workplace skills against the requirements of a particular job, and (2) to facilitate instruction that will enable that individual to improve skills where necessary.*"

> "Learning in order to know" should not be separated from "learning in order to do."
>
> LEARNING A LIVING: A Blueprint for High Performance

Different methods of collecting and treating occupational information by purposes of the analysis has created the above different job analysis techniques referenced above. It has been observed that even with different methods, analysis conducted for developing training or education programs has a core of common products and procedures. In analyzing the requirements (standards) of the workplace for instructional purposes the analysis must identify what the entry level worker must "do" and what the worker must "know" in order to perform the "doing".

Therefore the common processes of analysis for instructional purpose include, as a minimum, the following:

- establish and validate an inventory of job tasks (standards) by duty or function areas
- analyze each task for instructional content to identify:
    - steps or procedures for performing each task
    - knowledge (theory, safety, materials) required to perform each task
    - tools, equipment, materials required to perform the task
    - communication skills (reading, writing, listening) needed to learn and perform task
    - math skills needed to learn and perform the task
    - reasoning and problem solving skills needed to learn and perform tasks
    - SCANS competencies essential to performing the task. In some cases, the SCANS competencies may be a job task of the duty or function area.

After all of the instructional content has been identified, it becomes the responsibility of the instructor or instructional materials specialist to arrange the instructional content into a delivery sequence of "easy" to "difficult" and/or "simple" to "complex".

> "Imparting SCANS skills is not so much about curriculum as pedagogy: How instruction is delivered as opposed to what specifically is taught."
>
> Steffen Palko, Member of Secretary's Commission on Achieving Necessary Skills

If an occupational preparation program has been designed by clustering occupations having similar tasks/competencies and results, the task inventories of each occupation/job in the program cluster should be compared to determine if a career ladder(s) is identified.

The identification of career ladders in a certificate or associate degree program designed for a cluster of occupations will be made easier when occupational or job profiles are developed.

■ Scans Occupational Profile for Electrical Engineering Technicians

The word **profile** has been defined to include the meaning "*a set of data often in graphics or outline format to portray the significant features of something.*" Therefore, an occupation or job could have various profiles based on the types of data being presented by the profile and the proposed use of the profile. A task inventory could be classified as one kind of occupational or job profile.

SCANS FOUNDATIONS:

Basic skills: reading, writing, mathematics, listening, and speaking;
Thinking Skills: creative thinking, decision making, problem solving, ability to visualize, knowing how to learn, and reasoning;
Personal Qualities: responsibility, self-esteem, sociability, self-management, integrity, honesty

SCANS COMPETENCIES:

Resources: the ability to identify, organize, plan and allocate resources;
Interpersonal: the ability to work with others;
Information: the ability to acquire and use information;
Systems: the ability to understand and work effectively within complex inter-relationships;
Technology: the ability to work with a variety of technologies.

The primary purpose of this **Handbook** was to develop a scale (profile) that would provide the user of the **Handbook** with a list of SCANS "skills" (foundation) and the level of those "skills" required for successful entry-level employment as an electrical engineering technician. During the process of performing activities for achieving other objectives of the **Skills Standards and Certification Project** that were related to the

Handbook objective, it was concluded that there was sufficient data to develop several profiles that would be of value to career counselors and administrators, and instructors and instructional material specialists of education/training programs for electrical engineering technicians.

A profile of the SCANS requirements for the occupation of electrical engineering technician is presented in **Table A** in the TABLES SECTION of this manual. Table A with supporting **Tables D and E** provides a profile of the **SCANS three-part foundation** that will be of value to career counselors, curriculum material specialists, technical faculty, and local institution administrators responsible for the integration of academic and technical curricula content. Levels of achievement for the basic skills of the SCANS foundations are presented in Table A. The level of performance for the SCANS competencies will be 100 percent of the performance measures when they have been determined.

Table B and Table C provide two profiles of the identified workplace standards for the SCANS competency **"Technology"**. Table B provides a profile of the psycho-motor standards (tasks) of the electrical engineering technician's functions or duties of "*Fabricate and Demonstrate*" and "*Troubleshoot and Repair*". **Table C** presents a profile of the knowledge standards listed as, "*Demonstrate an understanding of*" - and "*Understand principles and operations of -*" and for the electrical engineering technician.

Tables F and G present an example of completed task analysis worksheets that show the requirements (standards) and the relationships of the tasks to SCANS. The content of Tables F and G will provide the base for activities performed to enhance the technical curriculum by integrating SCANS into the instructional content of the existing technical curriculum.

During the process of identifying national skills standards in the occupational field of electronics, the **Electronics Industries Foundation** (EIF) of Washington D.C. developed a list of **"Basic Skills"** required for the electronics industry. The list of "Basic Skills" identified by the Electronics Industry Foundation is presented in **Table H**.

■ SUMMARY

If occupational preparation programs are to be accountable in the **preparation of a workforce that is highly competitive in a global economy**, the content of the curricula for the programs designed under the concept of **career paths** for must be derived from the workplace. Using the results of occupational or job analysis and the task analysis (analysis for instruction), it will become evident that the curriculum for a career path (**technical instructional goal**) will include both **academic and technical courses**. It will also become evident that to enhance the motivation of students to learn at a pace of which they are capable, the concept of the correlated curriculum must be reinstated to achieve the congressional and state mandates for the **integration of the academics and technical courses** and the inclusion of the SCANS competencies in the curriculum of each career path.

It is anticipated that similar projects or procedures used by the National Skills Standards Projects will be used to determine performance measures and standards for the identified SCANS competencies. With passage of **Goals 2000: Educate America Act** by congress and signed into law by President Clinton, this anticipation will become a reality. **Goals 2000: Educate America Act** provides for the creation of a National Skills Standards Board related to occupational education program and the creation of National

Education Standards and Improvement Council related to academic education programs. This Act along with the National Skills Standards Act of 1994 will be coordinated with the School-to-Work Opportunities Act of 1994 in order to provide opportunities for the future workforce to be competitive in a global labor market.

TABLES SECTION

TABLE A

SCANS OCCUPATIONAL PROFILE

ELECTRICAL ENGINEERING TECHNICIANS

Table A

SCANS Occupational Profile for Electrical Engineering Technicians
(Preparation Time: "7" - 2 years to 4 years)

SCANS Competencies Required	SCANS Foundation		
	Skills	Levels	
Resources:	Basic Skills:	ACT	DOL
Allocates Time	Reading	7	5
Allocates Money	Writing	4	5
Allocates Material and Facility Resources	Arithmetic/ Mathematics	>7	5
Allocates Human Resources	Listening	5	3
Information:	Thinking Skills:	5	ALL
Acquires and Evaluates Information	Creative Thinking		
Organizes and Maintains Information	Decision Making		
Interprets and Communicates Info.	Problem Solving		
Uses Computers to Process Info.	Seeing Things in the Mind's Eye		
Interpersonal:	Knowing How to Learn		
Participates as a Member of a Team	Reasoning		
Teaches Others			
Serves Clients/Customers	Personal Qualities:	5	ALL
Exercises Leadership	Responsibility		
Negotiates of Arrive at a Decision	Self-Esteem		
Works with Cultural Diversity	Social		
	Self-Management		
Systems:	Integrity/Honesty		
Understands Systems			
Monitors and Corrects Performance			
Improves and Designs Systems			
Technology:			
Refer to Table B and Table C for Lists			

TABLE B

ELECTRONIC INDUSTRY FOUNDATION DRAFT SKILL STANDARDS PSYCHOMOTOR

TABLE B
Electronic Industry Foundation
Draft Skill Standards
Entry Level Electronics Technician
Psychomotor

A. General

B. DC Circuits

B.11 Fabricate and demonstrate DC series circuits
B.12 Troubleshoot and repair DC series circuits
B.14 Fabricate and demonstrate DC parallel circuits
B.15 Troubleshoot and repair DC parallel circuits
B.17 Fabricate and demonstrate DC series-parallel and bridge circuits
B.18 Troubleshoot and repair DC series-parallel and bridge circuits
B.20 Fabricate and demonstrate DC voltage divider circuits (Loaded and Unloaded)
B.21 Troubleshoot and repair DC voltage divider circuits (Loaded and Unloaded)
B.23 Fabricate and demonstrate DC RC and RL circuits
B.24 Troubleshoot and repair DC RC and RL circuits

C. AC Circuits

C.08 Fabricate and demonstrate AC capacitive circuits
C.09 Troubleshoot and repair AC capacitive circuits
C.11 Fabricate and demonstrate AC inductive circuits
C.12 Troubleshoot and repair AC inductive circuits
C.14 Fabricate and demonstrate AC circuits using transformers
C.15 Troubleshoot and repair AC circuits using transformers
C.17 Fabricate and demonstrate AC differentiator and integrator circuits
C.18 Troubleshoot and repair AC differentiator and integrator circuits
C.20 Fabricate and demonstrate AC series and parallel resonant circuits
C.21 Troubleshoot and repair AC series and parallel resonant circuits
C.23 Fabricate and demonstrate AC RC, RL, and RLC circuits
C.24 Troubleshoot and repair AC RC, RL, and RLC circuits
C.26 Fabricate and demonstrate AC frequency selective filter circuits
C.27 Troubleshoot and repair AC frequency selective filter circuits
C.29 Fabricate and demonstrate AC polyphase circuits
C.30 Troubleshoot and repair AC polyphase circuits
C.32 Fabricate and demonstrate AC phase locked loop circuits
C.33 Troubleshoot and repair AC phase locked loop circuits

D. Discrete Solid State Devices

D.07 Fabricate and demonstrate diode circuits
D.08 Troubleshoot and repair diode circuits
D.10 Fabricate and demonstrate optoelectronic circuits (gate isolators, interrupt sensors, infra red sensors, etc.)
D.11 Troubleshoot and repair optoelectronic circuits (Gate isolators, interrupt sensors, infra red sensors)
D.13 Fabricate and demonstrate single stage amplifiers
D.14 Troubleshoot and repair single stage amplifiers
D.16 Fabricate and demonstrate thyristor circuitry (SCR, TRIAC, DIAC, etc.)
D.17 Troubleshoot and repair thyristor circuitry (SCR, TRIAC, DIAC, etc.)

E. Analog Circuits

E.02 Fabricate and demonstrate multistage amplifiers
E.03 Troubleshoot and repair multistage amplifiers
E.05 Fabricate and demonstrate RF/IF circuits
E.06 Troubleshoot and repair RF/IF circuits
E.08 Fabricate and demonstrate linear power supplies and filters
E.09 Troubleshoot and repair linear power supplies and filters
E.11 Fabricate and demonstrate operational amplifier circuits
E.12 Troubleshoot and repair operational amplifier circuits
E.14 Fabricate and demonstrate audio power amplifiers
E.15 Troubleshoot and repair audio power amplifiers
E.17 Fabricate and demonstrate regulated and switching power supply circuits
E.18 Troubleshoot and repair regulated and switching power supply circuits
E.20 Fabricate and demonstrate active filter circuits
E.21 Troubleshoot and repair active filter circuits
E.23 Fabricate and demonstrate sinusoidal and non-sinusoidal oscillator circuits
E.24 Troubleshoot and repair sinusoidal and non-sinusoidal oscillator circuits
E.26 Fabricate and demonstrate fiber optic circuits using photodiodes or Lasers
E.27 Troubleshoot and repair fiber optic circuits using photodiodes or LASERS
E.29 Fabricate and demonstrate signal modulation systems (AM, FM, stereo)
E.30 Troubleshoot and repair signal modulation systems (AM, FM, stereo)

F. Digital Circuits

F.04 Fabricate and demonstrate linear integrated circuits
F.05 Troubleshoot and repair linear integrated circuits
F.07 Fabricate and demonstrate types of logic gates
F.08 Troubleshoot and repair types of logic gates
F.10 Fabricate and demonstrate combinational logic circuits
F.11 Troubleshoot and repair combinational logic circuits

F.13 Fabricate and demonstrate types of flip-flop circuits
F.14 Troubleshoot and repair flip-flop circuits
F.16 Fabricate and demonstrate types of registers and counters
F.17 Troubleshoot and repair types of registers and counters
F.19 Fabricate and demonstrate clock and timing circuits
F.20 Troubleshoot and repair clock and timing circuits
F.22 Fabricate and demonstrate types of arithmetic-logic circuits
F.23 Troubleshoot and repair types of arithmetic-logic circuits
F.25 Fabricate and demonstrate types of multiplexer and demultiplexer circuits
F.26 Troubleshoot and repair types of multiplexer and demultiplexer circuits
F.28 Fabricate and demonstrate types of digital to analog and analog to digital circuits
F.29 Troubleshoot and repair types of digital to analog and analog to digital circuits
F.31 Fabricate and demonstrate types of digital display circuits
F.32 Troubleshoot and repair types of digital display circuits
F.34 Fabricate and demonstrate digital power distribution and noise problems
F.35 Troubleshoot and repair digital power distribution and noise problems
F.37 Fabricate and demonstrate types of digital encoders and decoders
F.38 Troubleshoot and repair types of digital encoders and decoders
F.40 Fabricate and demonstrate digital display devices
F.41 Troubleshoot and repair digital display devices

G. Microprocessors

G.09 Fabricate and demonstrate types of microprocessor memory circuits
G.10 Troubleshoot and repair types of microprocessor memory circuits
G.12 Fabricate and demonstrate microprocessor machine code and instruction sets
G.13 Troubleshoot and repair microprocssor machine code and instruction sets

TABLE C

ELECTRONICS INDUSTRY FOUNDATIONS SKILL STANDARDS COGNITIVE

Table C
Electronic Industry Foundation
Draft Skills Standards
Entry Level Electronics Technician
Cognitive (Knowledge)

A. General

A.01 Demonstrate an understanding of proper safety techniques for all types of circuits and components (D.C. circuits, A.C. circuits, Audio systems, Analog circuits, Digital, Circuits, discrete solid-state circuits, microprocessors) and apply proper OSHA safety standards
A.02 Demonstrate an understanding of proper troubleshooting techniques
A.03 Demonstrate an understanding of basic assembly skills using hand and power tools
A.04 Demonstrate an understanding of acceptable soldering/desoldering techniques, including through-hole and surface mount devices
A.05 Demonstrate an understanding of proper solderless connections
A.06 Demonstrate an understanding of use of data books and cross reference/technical manuals to specify and requisition electronic components
A.07 Demonstrate an understanding of the interpretation and creation of electronic schematics and technical drawings
A.08 Demonstrate an understanding of recording of data, design curves and graphs
A.09 Demonstrate an understanding of color codes and other component descriptors
A.10 Demonstrate and understanding of site electrical and environmental survey

B. DC Circuits

B.01 Demonstrate and understanding of the relationship of electricity to the nature of matter
B.02 Demonstrate an understanding of sources of electricity (DC & AC)
B.03 Demonstrate an understanding of principles and operation of electrochemical supplies
B.04 Demonstrate an understanding of the meaning of and relationships among and between voltage, current, resistance, power and energy in D.C.
B.05 Demonstrate an understanding of measurement of resistance of conductors and insulators and the computation of conductance
B.06 Demonstrate an understanding of application of Ohms Law to series, parallel and series-parallel circuits

B.07 Demonstrate an understanding of magnetic properties of circuits and devices
B.08 Demonstrate an understanding of the physical, electrical characteristics of capacitors and inductors
B.09 Demonstrate an understanding of the maximum power transfer theory
B.10 Understand principles and operations of DC series circuits
B.13 Understand principles and operations of DC parallel circuits
B.16 Understand the principles and operations of DC series-parallel and bridge circuits
B.19 Understand the principles and operations of DC voltage divider circuits (Loaded and Unloaded)
B.22 Understand principles and operations of DC RC and RL circuits

C. AC Circuits

C.01 Demonstrate an understanding of the properties of an AC signal
C.02 Demonstrate an understanding of the principles of operation and characteristics of sinusoidal and non-sinusoidal wave forms
C.03 Demonstrate an understanding of basic motor/generator theory and operation
C.04 Demonstrate an understanding of measurement of power in AC and DC circuits
C.05 Demonstrate an understanding of the principle and operation of various power conditioning: (isolation transformers, surge suppressors, uninterruptable power systems)
C.06 Demonstrate an understanding of the principle and operation of safety grounding systems: (lightening arresters, ground fault interrupters, etc.)
C.07 Understand principles and operations of AC capacitive circuits
C.10 Understand principles and operations of AC inductive circuits
C.13 Understand principles and operations of AC circuits using transformers
C.16 Understand principles and operations of AC differentiator and integrator circuits (determine RC and RL time constants)
C.19 Understand principles and operations of AC series and parallel resonant circuits
C.22 Understand principles and operations of AC RC, RL, and RLC circuits
C.25 Understand principles and operations of AC frequency selective filter circuits
C.28 Understand principles and operations of AC polyphase circuits
C.31 Understand principles and operations of AC phase locked loop circuits

D. Discrete Solid State Devices

D.01 Demonstrate an understanding of the properties of semiconductor materials

D.02 Demonstrate an understanding of PN junctions
D.03 Demonstrate an understanding of bipolar transistors
D.04 Demonstrate an understanding of field effect transistors (FET's/MOS-FET's)
D.05 Demonstrate an understanding of special diodes and transistors
D.06 Understand principles and operations of diode circuits
D.09 Understand principles and operations of optoelectronic circuits (Gate isolators, Interrupt sensors, infra red sensors, etc.)
D.12 Understand principles and operations of single stage amplifiers
D.15 Understand principles and operations of thyristor circuitry (SCR, TRIAC, DIAC, etc.)

E. Analog Circuits

E.01 Understand principles and operations of multistage amplifiers
E.04 Understand principles and operations of RF/IF circuits
E.07 Understand principles and operations of linear power supplies and filters
E.10 Understand principles and operations of operational amplifier circuits
E.13 Understand principles and operations of audio power amplifiers
E.16 Understand principles and operations of regulated and switching power supply circuits
E.19 Understand principles and operations of active filter circuits
E.22 Understand principles and operations of sinusoidal and non-sinusoidal oscillator circuits
E.25 Understand principles and operations of fiber optic circuits using photodiodes or LASERS
E.28 Understand principles and operations of signal modulation systems
E.31 Demonstrate an understanding of motor phase shift control circuits
E.32 Demonstrate an understanding of cathode ray tubes

F. Digital Circuits

F.01 Demonstrate an understanding of the characteristics of integrated circuit (IC) logic families
F.02 Demonstrate an understanding of minimizing logic circuits using Boolean operations
F.03 Understand principles and operations of linear integrated circuits
F.06 Understand principles and operations of types of logic gates
F.09 Understand principles and operations of combinational logic circuits
F.12 Understand principles and operations of types of flip-flop circuits
F.15 Understand principles and operations of types of registers and counters
F.18 Understand principles and operations of clock and timing circuits
F.21 Understand principles and operations of types of arithmetic-logic circuits

F.24 Understand principles and operations of multiplexer and demultiplexer circuits
F.27 Understand principles and operations of digital to analog and analog to digital circuits
F.30 Understand principles and operations of types of digital display circuits
F.33 Understand principles and operations of digital power distribution and noise problems
F.36 Understand principles and operations of digital encoders and decoders
F.39 Understand principles and operations of digital display devices

G. Microprocessors

G.01 Demonstrate an understanding of microprocessor peripherals and their interfaces
G.02 Demonstrate an understanding of troubleshooting and repair of microprocessor peripheral interfaces
G.03 Demonstrate an understanding of types of microprocessor peripherals
G.04 Demonstrate an understanding of the properties of essential microprocessor components
G.05 Demonstrate an understanding of the use of a microcomputer operating system
G.06 Demonstrate an understanding of microprocessor BUS concepts
G.07 Demonstrate an understanding of microprocessor components and terminology (CPU, AU, Device Driver, ROM, RAM, EPROM, etc.)
G.08 Understand principles and operations of types of microprocessor memory circuits
G.11 Understand principles and operations of microprocessor machine code and instruction sets

TABLE D

ACT WORK KEYS PROFILE

TABLE D

ACT WORK KEYS PROFILE

ACT
Work Keys Profile

Occupation Title: **Electrical Engineering Technician**
Total Number of Subject Matter Experts: **8**
Number of Employers Represented: **3**
Number of SME Groups: **1**
March 9, 1994

Reading for Information	*Applied Mathematics*	*Listening*	*Writing*	*Locating Information*	*Teamwork*	*Applied Technology*
7	>7	5	4	>6	NC	>6

Briefly, profiling involved the following four steps:

1. Developing a list of the most critical tasks to the occupation;
2. Sorting the tasks into categories associated with each *Work Keys* skill;
3. Identifying on-the-job behaviors associated with each skill as it is used in the occupation;
4. Determining the *Work Keys* skill levels of the occupation.

As the initial step, subject matter experts (SMEs), consisting of employees identified as having firsthand knowledge of the requirements of the occupation, reviewed a task list taken from the *Dictionary of Occupational Titles* for relevance and comprehensiveness. They deleted any tasks they considered unimportant, revised some task statements, and added tasks that they considered important to the occupation. The SMEs rated each task on both IMPORTANCE, the significance of the task to overall occupational performance, and RELATIVE TIME SPENT, the amount of time spent performing this task compared to other tasks. The CRITICALITY of each task to the occupation (the multiplication of IMPORTANCE and RELATIVE TIME SPENT) was then calculated. The SMEs reviewed the list of tasks and their CRITICALITY rating and revised the list so that only the most critical tasks remained.

Using this list of most critical tasks, the SMEs discussed how the *Work Keys* skills (i.e., *Applied Mathematics, Reading for Information*, etc.) were required for effective performance of each task, and then sorted the tasks into categories associated with each skill (tasks could be sorted into more than one category). Guided by these new lists, the SMEs identified on-the-job behaviors and activities that required the skill, such as reading manuals, calculating the sum of a list of numbers, etc. Finally, the SMEs reviewed the descriptions of the *Work Keys* skills to determine the levels of *Reading for Information, Applied Mathematics, Listening, Writing, Locating Information, Teamwork*, and *Applied Technology* needed to perform the tasks of the occupation.

The resulting profile determined by the SMEs is presented in the table at the top of this page. The most critical tasks and a description of the *Work Keys* skills levels for this occupation are presented on the following pages.

Profile Comments

The subject matter experts convened to produce the profile for Electrical Engineering Technician were primarily represented by one employer. The other two employers were represented by one participant each. However, these two representatives contributed their share in producing the profile.

The purpose of conducting a profile for the Electrical Engineering Technician occupation was to use the resulting information for curriculum development. For this reason, the SMEs were instructed to think of the skill levels needed for an individual entering the occupation (i.e., at the entry level). However, all the SMEs stated that an individual who has completed a program for the occupation will not be able to start out as an Electrical Engineering Technician. The person would have to start out as a Test Technician to obtain the relevant knowledge and experience to become an Electrical Engineering Technician. As a result, the profile is based on the tasks that the SMEs currently perform and on the skills and skill levels needed the SMEs were required to perform those tasks.

The discussion among the SMEs regarding appropriate skill levels resulted in a number of interesting observations which are summarized below.

Reading for Information: The group was in agreement that Level 7 is required for the occupation.

Applied Mathematics: The group agreed that at the least Level 7 is required for the occupation. They stated that Electrical Engineering Technicians regularly perform trigonometry calculations and other complex mathematical problems that require skills more complex than those at Level 7.

Listening: The group agreed that Level 5 is required for the occupation.

Writing: The group agreed that Level 4 is required for the occupation.

Locating Information: The group agreed that at the least Level 6 is required for the occupation. They stated that Electrical Engineering Technicians routinely read, interpret, draw, and modify schematics, diagrams, charts, and graphs that are more complex than those at Level 6.

Teamwork: The group did not reach consensus on the level of *Teamwork* skill required for the occupation for three reasons. First, the three employers have different structures for work teams. One of them is in the process of implementing work teams, one is well underway, and one does not have any plans for instituting work teams. Second, some of the SMEs felt very strongly against the team concept, while some felt very strongly for the team concept. Neither camp would relent from their position. Third, the discussion revealed that some work teams of Electrical Engineering Technicians operate at Level 6 skills, while some operate using skills at other levels.

Applied Technology: The group agreed that at the least Level 7 is required for the occupation. They stated that the problems at Level 7 are elementary compared to the problems they encounter on the job.

ACT

Final Task List

1. Provides prompt and efficient service to suppliers and customers (e.g., the party who gets the product and associated test equipment) in installing, repairing, and servicing products and associated equipment.
2. Maintains the quality of services to customers, such as in installing, repairing, and servicing the products and associated equipment.
3. Follows safety procedures in testing or manufacturing products to prevent on-the-job injuries.
4. Understands how one's work contributes to the success of the work team or company.
5. Works in teams to test and troubleshoot products and associated test equipment.
6. Communicates with other departments or customers to present products and associated test equipment.
7. Interprets engineering drawings, schematic diagrams, assembly drawings, or formulas for developing products.
8. Determines malfunctions of testing equipment, such as power supplies, receivers, and indicators, using schematic and signal tracing techniques.
9. Trains technicians and/or customers to install, repair, test, and maintain products and associated test equipment.
10. Analyzes detailed operations of circuits, such as amplifiers, multivibrators, power supplies, and switching circuits.
11. Builds prototype electrical or electro-mechanical models from engineering drawings.
12. Diagnoses the cause of electrical or mechanical malfunctioning of testing equipment.
13. Suggests improvements in work methods and procedures in testing products.
14. Enters and analyzes test data using computer spreadsheets (e.g., LOTUS and EXCEL).
15. Evaluates data and writes reports to validate or indicate deviations from existing standards.
16. Installs and modifies testing equipment.
17. Prepares graphs or charts of testing data for presentation or record keeping.
18. Assembles and tests switch panels, transformers, generators, transmitters, circuit boards, and other electrical equipment and components.
19. Builds and wires new equipment to test products, such as, circuit boards, cable harnesses, and mechanical assemblies (e.g., panels, drawers, and fixtures).
20. Conducts operational and mechanical tests on prototype products.
21. Consults engineering and management personnel to set quality standards in production.
22. Modifies electrical prototypes to correct functional deviations.
23. Recommends modifications of existing quality or production standards.
24. Recommends modifications to products that do not fit acceptable specifications.
25. Compiles statistical data to determine and maintain quality and reliability of products.
26. Develops electrical machinery, circuitry, and control equipment for products.
27. Evaluates assembly requirements and configuration of products.
28. Identifies problems in software and modifies computer software to test products and associated test equipment.
29. Selects and operates the functional and operational equipment (e.g., oscilloscopes, network analyzer, and spectrum analyzer) to test products.
30. Conducts preventive and corrective maintenance on testing equipment.

Final Task List (continued)

31. Draws wiring and lays out diagrams for developing prototype products using schematic capture software.
32. Recommends revision of methods of operation or material handling, alterations in equipment layout, or other changes to increase production or improve standards.
33. Compiles an engineering change notice (ECN) for modification to the products or associated equipment by including description of change, drawings, and tables.
34. Conducts cost production studies to determine how to cut cost.
35. Designs packaging of PC board layout.
36. Performs component and device characterization (validation).
37. Plans and directs periodic evaluation of testing equipment.
38. Prepares charts, graphs, and diagrams to illustrate workflow, routing, floor layouts, material handling, and machine utilization.
39. Programs test equipment to determine the accuracy of products.
40. Designs testing programs and performs testing of integrated circuits.
41. Reads computer software and writes computer subroutines.
42. Sets up and performs destructive and nondestructive tests on products to measure performance, life, or material characteristics.

Skill Level Descriptions

Electrical Engineering Technicians Occupation

Reading for Information Level: 7

(Levels range from 3 to 7, "X" indicates skill is not applicable or is below Level 3)

Level 7

Employees must read materials which are very difficult: the information is detailed, the concepts are complicated, and the vocabulary is difficult. The jargon and technical terms used are not defined in the reading materials. Employees must generalize beyond stated situations, understand implied details, and figure out the reasoning behind stated policies and procedures.

Employees are required to

- figure out the definitions of difficult, uncommon jargon or technical terms from the context of the reading materials.
- figure out the general principles underlying described situations and apply them to situations neither described in nor completely similar to those in the reading materials.

Applied Mathematics Level: >7

(Levels range from 3 to 7, "X" indicates skill is not applicable or is below Level 3)

Level 7

Employees are required to

- do several steps of reasoning and calculations.
- solve problems involving more than one unknown and nonlinear functions (e.g., rate of change).
- find mistakes in multiple-step calculations.
- figure out the information needed to solve a problem when the information presented is incomplete or implicit.

For example, employees might be required to convert between systems of measurement that involve fractions, mixed numbers, decimals, or percentages; to calculate multiple areas and volumes of spheres, cylinders, or cones; or to set up and manipulate complex ratios or proportions.

Skill Level Descriptions (continued)

Listening Level: 5
(Levels range from 0 to 5)

Level 5

Employees must understand all the information from the spoken material. In addition, they must have insight into the situation, such as information about tone or subtle details.

Writing Level: 4
(Levels range from 0 to 5)

Level 4

Employees' writing conveys information clearly. All of the sentences in the writing are complete, though they may be choppy. Writing does not contain any slang. There may be a few minor mechanical errors, but these errors do not interfere with understanding the meaning.

Locating Information Level: >6
(Levels range from 3 to 6, "X" indicates skill is not applicable or is below Level 3)

Level 6

Employees must read complex workplace graphics containing large amounts of information and/or challenging presentations. These graphics include very detailed graphs, charts, tables, and forms, as well as very complicated maps, blueprints, and diagrams.

Employees are required to

- make decisions, draw conclusions, and apply information to new situations using one complex graphic or several related graphics.

Skill Level Descriptions (continued)

Teamwork Level: No Consensus

(Levels range from 3 to 6. "X" indicates skill is not applicable or is below Level 3)

The group did not reach consensus as to the level of teamwork skill that is required for the occupation of Electrical Engineering Technician.

Applied Technology Level: >6

(Levels range from 3 to 6. "X" indicates skill is not applicable or is below Level 3)

Level 6

Employees are required to solve problems involving one or more tools or systems across a range of complexity. In solving some of these problems, employees must apply **difficult** physical principles, such as phase change or pressure equilibrium in a system. In solving others, employees must understand and correctly interpret the interaction of **multiple complex** systems.

Employees are required to

- understand advanced principles of mechanics, electricity, thermodynamics, and fluid dynamics.
- understand the operation of complex machines and systems, such as gasoline engines, complex appliances, and building electrical systems.

TABLE E

CROSSWALK SCANS PROFILES

41

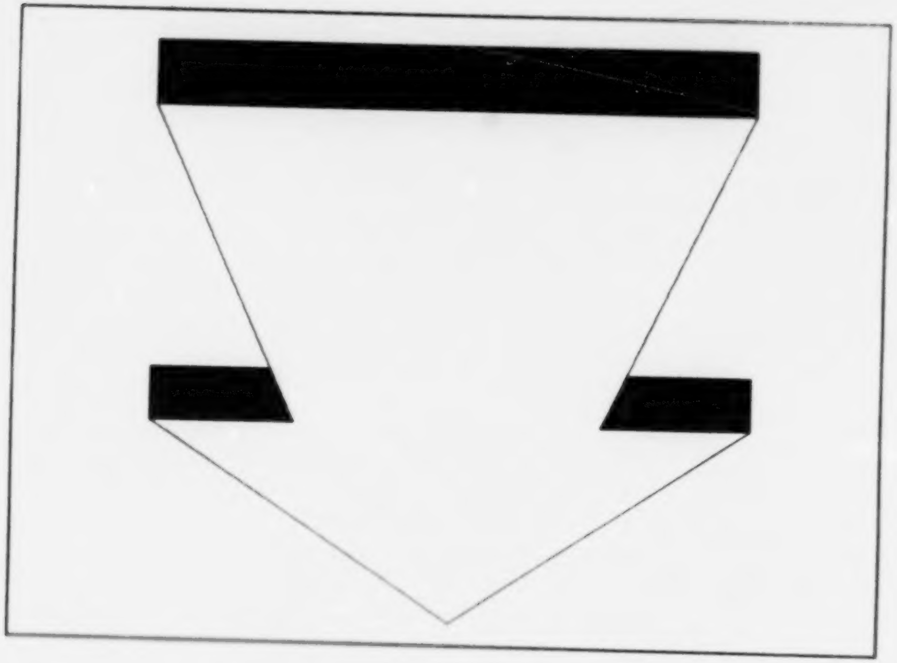

TABLE E
SCANS Arithmetic/Math Crosswalk

F3 Arithmetic

- a) performs basic computations
- b) uses basic numerical concepts such as whole numbers and percentages in practical situations
- c) makes reasonable estimates of arithmetic results without a calculator
- d) uses tables, graphs, diagrams, and charts to obtain or convey quantitative information.

F4 Mathematics

- a) approaches practical problems by choosing appropriately from a variety of mathematical techniques
- b) uses quantitative data to construct logical explanations for real world situations
- c) expresses mathematical ideas and concepts orally and in writing
- d) understands the roll of chance in the prediction and control of events.

General Education Development:

Level 2: Grade 4-6
Level 3: Grade 7-8
Level 4: Grade 9-12
Level 5: College 1-2

ACT WORK KEYS:

Level 3: Problems at this level measure the examinee's skill in performing basic mathematical operations (addition, subtraction, multiplication, and division) and conversions from one form to another, using whole numbers, fractions, decimals, or percentages. Solutions to problems at this level are straightforward, involving a single type of mathematical operation. Problems at this level translate easily from a verbal setup to a mathematical equation. All the information needed to solve the problems is provided in logical order and no unrelated information is included. Problem setups may include units of measurement. However, with the exception of dollars and cents, these units function solely as labels and are not involved in actual calculation.

Level 4: Problems at this level measure the examinee's skill in performing one or two mathematical operations, such as addition, subtraction, or multiplication, on several positive or negative numbers. (Division of negative numbers is not covered until Level 5.) Problems may require adding commonly known fractions, decimals, or percentages (e.g., ½, .75, 25%), or adding three fractions that share a common denominator. At this level, the examinee is also required to calculate averages, simple ratios, proportions, and rates, using whole numbers and decimals. Problems at this level require the examinee to reorder verbal information before performing calculations. The examinee must read the entire problem carefully to determine which operation(s) to perform and in what order. In some problems, examinees must read a simple chart or graph to obtain the information needed to solve the problem.

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Level 5: This requires the examinee to look up and calculate single-step conversions within English or non English systems of measurement (e.g., converting from ounces to pounds or from centimeters to meters) or between systems of measurement (e.g., converting from centimeters to inches). These problems also require calculations using mixed units (e.g., hours and minutes). Problems at this level contain several steps of logic and calculation. The examinee must determine what information, calculations, and unit conversions are needed to find a solution.

Level 6: Problems at this level measure the examinee's skill in calculating using negative numbers, fractions, ratios, percentages, and mixed numbers. The examinee might be required to calculate multiple rates to find areas of rectangles or circles and volumes of rectangular solids or to solve problems that compare production rates and pricing schemes. The examinee might need to transpose a formula before calculating or to look up and use two formulae in conversions within a system of measurement. These problems may also involve identifying and correcting errors in calculations. These problems may require considerable translation from verbal form to mathematical expression. These generally require considerable set up and involve multiple-step calculations or conversions.

Level 7: Problems at this level require multiple steps of logic and calculation. The examinee may be required to convert between systems of measurement that involve fractions, mixed numbers, decimals, or percentages; to calculate multiple areas and volumes of spheres, cylinders, and cones; to set up and manipulate complex ratios and proportions; or to determine the better economic value of several alternatives. Problems may involve more than one unknown, nonlinear functions (e.g., rate of change), and applications of basic statistical concepts (e.g., error of measurement). The examinee may be required to locate errors in multiple-step calculations. Problem content or format may be unusual, and the information presented may be incomplete or implicit, requiring the examinee to derive from the setup the information needed to solve the problem.

Math Crosswalk of Skills Descriptions

ACT	SCANS	Coordinating Board Research (CBR)	Department of Labor General Educational Development (G.E.D.)	Improvement for Undergraduate Education in Texas: College Level Competencies Fund for the Improvement of Postsecondary Education (F.I.P.S.E.)	Texas Academic Skills Program (T.A.S.P.)
<3	F3-B	Write whole numbers from written text (six thousand three = 6003).	*Level 2 Read and write 7-digit numbers.	Use mathematics comfortably and spontaneously in many different settings, in a variety of courses.	1. Use number concepts and computation skills. This skill includes adding, subtracting, multiplying, and dividing fractions, decimals, and integers; using the order of operations to solve problems; solving problems involving percents; performing calculations using exponents and scientific notation; estimating solutions to problems; and using the concepts of "less than" and "greater than".
3	F3-a,b	Add and subtract single and multiple digit whole numbers.	Learn ordinals through "thousands".	Determine when a problem requires a fixed answer and when estimation is appropriate.	
<3	F3-b	Read and count single and multiple digit whole numbers.	Count fractions and decimal fractions.		
<3	F3 b	Round off single and multiple digit whole numbers.	Place values of numbers to left and right of decimal point.		
<3	F3-b	Read and write common fractions.	Add multi-digit columns.		
3	F3-a	Multiply and divide common fractions.	Subtract multi-digit columns.		
3	F3-a	Reduce fractions to lowest terms.	Multiply two or three-digit multipliers. Two or three digit divisors.		
3	F3-a	Find common denominator.	Add, subtract, multiply, and divide common and decimal fractions, mixed numbers, improper fractions.		
4	F3-a	Change fractions from one denominator to another.			
3	F3-b	Translate a mixed number into an improper fraction and reverse.	Introduction to ratio and rate, percent. Change fractions to decimal fractions and to percent.		

ACT	SCANS	C.B.R.	(G.E.D.)	(F.I.P.S.E.)	(T.A.S.P.)
3	F3-a	Carry out arithmetic computations involving dollars and cents.	*Level 3 Mastery of four basic arithmetic operations. Emphasis on speed and accuracy in computation. Extension to 4- and 5-digit multipliers and divisors. Learn use of symbols for numbers, terms such as exponent and power. Learn to find square roots.		
<3	F3-b	Read and write decimals with one or more places.			
<3	F3-b	Round off decimals to one or more places.			
4	F3-a	Multiply and divide decimals with one or more places.			
3	F3-a	Add and subtract decimals with one or more places.			
3	F3-a	Convert fraction to decimal equivalent and vice versa.			
3	F3-a,b	Convert decimal number to percent and vice versa.			
<3	F3-b	Read and write percents.			
3	F3-a,b	Compute percents.			
3	F3-a	Convert mixed numbers to decimals and decimal fractions to mixed numbers.			
4	F3-a	Compute averages.			
5	F3-a	Perform conversions within metric system (weight, distance, volume).			
<3	F3-a,F4-a	Use a calculator to perform basic arithmetic operations.			
6	F4-a, c	Use formulas appropriately.			
3	F3-c	Estimate distances in inches, feet, yards, and miles.			
>7	F4-c,a	Convert base ten numbers to other base number systems.			

ACT	SCANS	C.B.R.	G.E.D.	(F.I.P.S.E.)	T.A.S.P.
7	F4 a	Factor.			
4	F4 c	Recognize and name types of angles.			
4	F3 d	Recognize and name geometric figures.			
6	F3 a, F4 a	Solve problems to find length of sides of angles of geometric figures.	*Level 2 Introduction to reasoning and analysis of problems such as finding a part of a number. Finding the whole when a part is given. Learn relationships of standard units of measurement to each other. Convert units of measure to smaller or larger units, such as inches to feet, acres to square miles, hours to days, minutes to seconds, or ounces to pounds.	Examine a problem situation from different perspectives and use corresponding mathematical structures. Evaluate the appropriateness of different methods of problem solution. Be selective in the use of a variety of solution strategies. Employ a variety of strategies in searching for a solution to a problem.	2. Solve word problems involving integers, fractions, or decimals (including percents, ratios, and proportions). This skill includes determining the appropriate operations to solve word problems involving integers, fractions, decimals, percents, ratios, and proportions.
3	F3-a, F4-c	Use arithmetic operations to solve word problems with whole numbers.			
3	F4 a, c	Perform arithmetic operations using correct hierarchy.			
3	F3-a, F4-a	Solve word problems with common fractions.			
3	F3-a, F4-a	Solve word problems with decimals in one or more places.			
<3	F3-b, F4-c	Write digit equivalents of orally stated decimal number.			
3	F3-a, F4-c	Solve word problems.			
6	F3-a, b	Solve problems involving ratio and proportions.	*Level 3 Mastery of the four basic arithmetic operations in common, decimal and improper fractions and mixed numbers. Apply knowledge to solve "story problems".		
5	F3-a	Solve problems involving time, weight, distance, and volume.			
7	F3-c, F4-a	Determine if a solution to a mathematical problem is reasonable.			

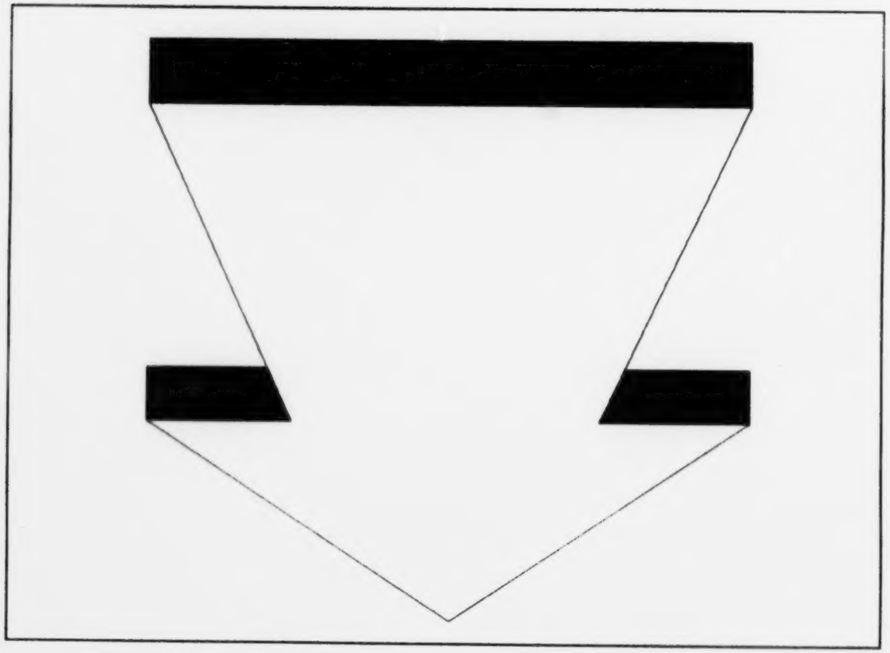
ACT	SCANS	C.B.R.	G.E.D.	F.I.P.S.E.	T.A.S.P.
6	F3 a,b	Solve basic ratio problems.	Develop speed and accuracy in changing fractions into percent and percent into fractions.		
6	F3 a	Reduce ratios to lowest terms.			
6	F3 a,b, F4 a	Utilize ratio and proportion to solve word problems.	Memorize most common equivalents, such as halves, quarters, eighths, fifths, thirds, sixths, and twelfths, and mentally convert time to decimal fractions and percents.		
7	F3 a, d	Find sine, cosine, and tangent of an angle using a table and calculator.	Memorize and apply formulas to solve "story problems:, as: $P=RB \quad R=\frac{P}{B} \quad B=\frac{P}{R}$ Perform the four basic arithmetic functions to solve problems involving different units of same type of measurement, as: Time: 4wks. 6 days 32 hrs. +2wks. 3 days 25 hrs. Apply knowledge of percentage to compute interest, discount, etc. Learn to use ratio and proportion to solve problems.		
7		No close match found.	*Level 4 Review and extension of principles of common and decimal fractions, percentages, ratio, and proportion. Practical computation. Practical algebra.		

ACT	SCANS	C.B.R.	G.E.D.	F.I.P.S.E.	T.A.S.P.
			Metric geometry.		
			Formulas for computing ratios of pulleys and gears.		
			Practical physics: Formulas for work and power, etc.		
			*Level 5		
			Interest and discount.	Communicate, either orally or in writing, mathematical understanding of the analysis and the solution of a problem, using proper mathematical terminology and syntax.	3. Interpret information from a graph, table or chart. This skill includes interpreting information in line graphs, bar graphs, pie graphs, pictographs, tables, charts, or graphs of functions.
7	F3 d, F4 a	No close match found.	*Level 3		
			Learn to construct and interpret line, bar, and picture graphs.		
7			Convert degrees to percents to draw circle graphs.		
				Make and defend decisions by organizing and presenting data, by using logical arguments and by using probability.	
4			*Level 5		
			In statistics, graphic presentations illustrating average, dispersions, quartiles and percentiles, frequency distribution, reliability, and validity of tests.		
					B. Algebra
7	F4-a, F3-a	Use direct and inverse variations to solve word problems.	No close match found.	Generalize over many similar mathematical situations.	1. Graph numbers or number relationships.
7	F3-d, F4-a	Construct graphs on coordinate plane.			This skill includes identifying points from their coordinates, the coordinates of points, or graphs of sets of ordered pairs; identifying the graphs of equations or inequalities, finding the slopes and intercepts of lines; and recognizing direct and inverse variation presented graphically.

ACT	SCANS	C.B.R.	G.E.D.	F.I.P.S.E.	T.A.S.P.
7	F3 a	Solve linear equations in one variable.	*Level 5 Linear equation.	No close match found	2. Solve one and two variable equations. This skill includes finding the value of the unknown in one variable equations, expressing one variable in terms of a second variable in two-variable equations, and solving a system of two linear equations in two variables.
7	F3 a	Solve linear inequalities (extended).			
7	F3 a, F4 a	Solve systems of inequality (extended).			
4	F3 a, F4 a	Solve proportion problems with one unknown.			
7	F3 a	Solve systems of linear equations.			
		No close match found	No close match found	Discover inconsistencies in problems. Read, write and understand the language of mathematics.	3. Solve word problems involving one and two variables. This skill includes solving word problems that can be translated into one-variable linear equations and identifying the equation or equations that correctly represent the mathematical relationship(s) in word problems.
7	F3 a, F4 a	Add, subtract, multiply, and divide algebraic expressions.	*Level 4 Formal study of number systems. Operations on polynomials and rational expressions; solution of equations and inequalities; use of deduction and proof.	No close match found	4. Understand operations with algebraic expressions. This skill includes factoring quadratics and polynomials; adding, subtracting, and multiplying polynomial expressions; and performing basic operations on and simplifying rational expressions.
7	F3 a, F4 a	Add, subtract, multiply, and divide algebraic fractions.			
7	F3 a, F4 a	Use exponents and square roots appropriately.			

ACT	SCANS	C.B.R.	G.E.D.	F.I.P.S.E.	T.A.S.P.
			Study of the systems of real numbers; linear, quadratic, rational, exponential, logarithmic, angle, and circular functions; inverse functions; related algebraic functions.		
7	F3 a, F4 a	Solve quadratic equations by factoring.	*Level 5 Exponents. *Level 5 Quadratic equations	No close match found	5. Solve problems involving quadratic equations. This skill includes graphing quadratic equations, solving word problems involving quadratics, identifying the algebraic equivalent of stated relationships, and solving quadratic equations.
7	F3-d, F4-a	Construct graphs on coordinate plane.			
7	F3-a, F4-a	Find sine, cosine, and tangent of an angle using a table and calculator.	*Level 5 General introduction to the concepts of algebra, plane geometry.		C. Geometry 1. Solve problems involving geometric figures. This skill includes identifying the appropriate formula for solving geometric problems, solving problems involving two- and three-dimensional geometric figures, and solving problems involving right triangles using Pythagorean theorem.
6	F3 a	Solve problems to find length of sides and angles of geometric figures.			
4	F3-d	Recognize and name types of angles.	*Level 2 Learning geometric meanings of terms such as radius, diameter, perimeter, circumference, area of rectangle and volume. Construct graphs, charts, and tables. Construct simple geographic forms such as arcs, triangles and perpendiculars.	Reasoning clearly and present logical arguments using both inductive and deductive methods.	2. Apply reasoning skills. This skill includes drawing conclusions using the principles of similarity, congruence, parallelism, and perpendicularity and using inductive and deductive reasoning.
7	F3-b, F4-c	Recognize and name geometric figures.			
7	F4-a, F3-d	Prepare a truth table.			
7	F4-a, F3-d	Obtain unions and intersections of given sets.			

ACT	SCANS	C.B.R.	G.E.D.	F.I.P.S.E.	T.A.S.P.
			*Level 3 Recognize and understand geometric meanings of terms as horizontal, vertical, perpendicular, oblique and obtuse. Learn number of degrees in a circle, relationship between angles and degrees, types of triangles: equilateral, isosceles, right and obtuse. Types of parallelograms: oblong, square, rhomboid, and rhombus. Learn formulas for finding area of geometric figures. *Level 5 Development of propositional and predicate calculi, basic semantic concepts and elementary intuitive set theory.		



SCANS Reading Report

F1 a) Locates, understands, and interprets written information documents including manuals, graphs, and schedules to perform basic trends. b) Learns from text by determining the main idea or essential message; c) Identifies relevant details, facts, and specifications; d) Infers or locates the meaning of unknown or technical vocabulary; e) Judges the accuracy, appropriateness, style, and plausibility of reports, proposals, or theories of other writers.

General Education Development:

Level 2: Grade 4-6
Level 3: Grade 7-8
Level 4: Grade 9-12
Level 5: College 1-2

ACT WORK KEYS:

Level 3: This level requires the examinee to identify uncomplicated key concepts and simple details; recognize the proper placement of a step in a sequence of events, or the proper time to perform a task.

Level 4: This level requires the skills tested at Level 3 plus identify details that are more subtle than those in Level 3; recognize the application of more complex instructions, some of which involve several steps, to describe situations; recognize cause-effect relationships.

Level 5: This requires the examinee to have the skills included in Levels 3 and 4 plus to identify the paraphrased definition of jargon or technical terms that are defined in the passage and recognize the application of jargon or technical terms to stated situations; recognize the definitions of acronyms that are defined in the passage; identify the appropriate definition of words with multiple meanings; recognize the application of instructions from the passage to new situations that are similar to the situations described in the reading materials; and recognize the application of more complex instructions to described situations, including conditionals and procedures with multiple steps.

Level 6: This level requires the examinee to have the skills included in Levels 3, 4, and 5 plus to recognize the application of jargon or technical terms to new situations; recognize the application of complex instructions to new situations; recognize the less common meaning of a word with multiple meanings from context; identify implied details; explain the rational behind a procedure, policy or communication; and generalize from the passage to a somewhat similar situation.

Level 7: This level requires the examinee have the skills in levels 3, 4, 5, and 6 plus to recognize the definitions of difficult, uncommon jargon or technical terms from context and generalize from the passage to situations neither described in nor completely similar to those in the passage.

READING CROSSWALK OF IDENTIFIED SKILL DESCRIPTIONS

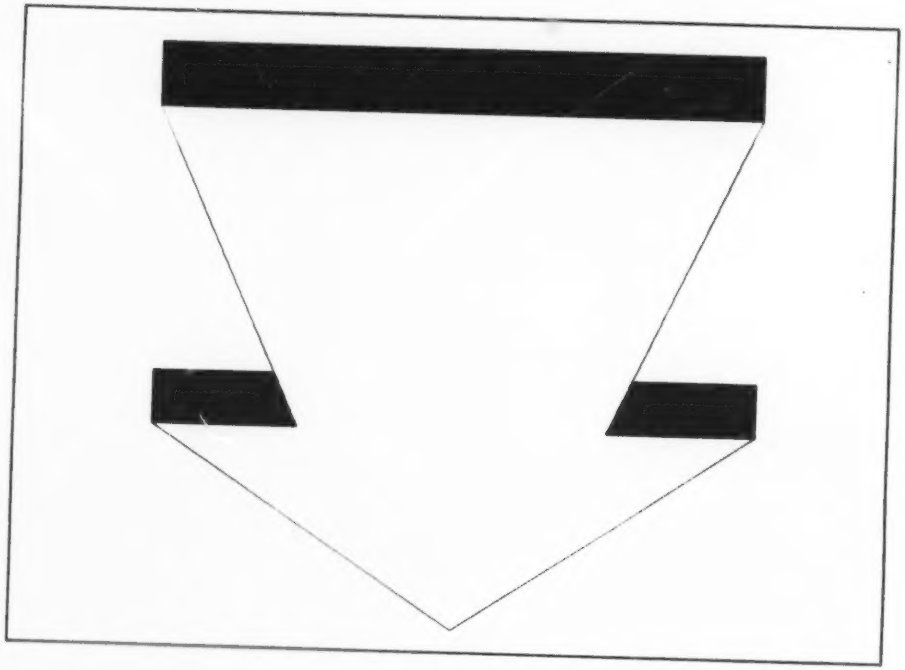
ACT	SCANS	Coordinating Board Research	Department of Labor General Educational Development (G.E.D.)	Improvement for Undergraduate Education in Texas: College Level Competencies Fund for the Improvement of Postsecondary Education (F.I.P.S.E.)	Texas Academic Skills Program (T.A.S.P.)
3	F1-a	Find, read and understand information written on a grade level of 8, 10, 12, 14, and above	*Level 2 In reading learn roots, prefixes, and suffices. Learn to read discriminately, distinguishing between essential and non-essential material. Enrich vocabulary with wide selection of reading material. Introduction to magazines, newspaper, bulletins, etc.	No close match found.	1. Determine the meaning of words and phrases. This skill includes using the context of a passage to determine the meaning or words with multiple meaning, unfamiliar and uncommon words and phrases, and figurative expressions.
5	F1-a	Read information written on a level of difficulty above grade 14.			
3	F1-c	Read and interpret job-related forms.			
3	F1-b	Read and understand short notes, memos, and letters.			
	F1-d	Use context and signal words to determine definitions of new words.			

ACT	SCANS	C.B.R	G.E.D.	F.I.P.S.E.	T.A.S.P.
4	F1-b	Paraphrase a passage to confirm one's understanding of what was read.	*Level 3 Read to find main thought or idea of a paragraph. Locate topic and summary sentence, and identify details and relate them to central thought.	Comprehend key terms and discriminate between main and subordinate ideas either explicitly stated or impled by the text. Recognize how subordinate ideas contribute to the development of a major lead in the overall discussion.	2. Understand the main idea and supporting details in written material. This skill includes identifying explicit and implicit main ideas and recognizing ideas and recognizing ideas that support, illustrate, or elaborate the main ideas of a passage.
5	F1-b	Distinguish between the major premise and supporting facts.			
4	F1-b	Explain the main idea in written or oral communication.			
4	F1-e	No close match found.	*Level 5 Reading literature, book and play reviews, scientific and technical journals, abstract, financial reports, legal, historical and medical documents, periodicals.	Understand the author's use of literary device such as simile, metaphor, allusion, imagery, and point of view. Recognize the author's assumptions and biases while withholding final judgment. Recognize the text's audience, purpose, and occasion.	3. Identify a writer's purpose, point of view, and intended meaning. This skill includes recognizing a writer's expressed or implied purpose for writing; evaluating the appropriateness of written material for various purposes or audiences; recognizing the likely effect on an audience of a writer's choice of words; and using the content, work choice, and phrasing of a passage to determine a writer's opinion or point of view.

ACT	SCANS	C.B.R.	G.E.D.	F.I.P.S.E.	T.A.S.P.
5	F1-e	Evaluate the relevance and strength of support for a conclusion.	*Level 5 Study of the principles of inductive and deductive reasoning such as testing evidence, validity of generalization, and cause and effect relationships to detect fallacies in arguments and to avoid these errors in own writing. (also in writing IIA, 1., b.)	Organize thoughts to guide comprehension by step-by-step or spatial sequences, cause-effect relationships, comparisons or contrasts, and problem-solution methods. Recognize either conventional patterns or organization or educe and impose organization on the text when the author does not make the organization clear. Arrive at appropriate conclusions and select supportive evidence from the text.	4. Analyze the relationship among ideas in written material. This skill includes identifying the sequence of events or steps, identifying cause-effect relationships, analyzing relationships between ideas in opposition, identifying solutions to problems, and drawing conclusions inductively and deductively from information stated or implied in a passage.
5	F1-e	Recognize patterns of organization of information-cause, effect, etc.			
5	F1-e	Identify the conclusions in written and oral communication.			
5	F1-e	Distinguish between fact and opinion.	No close match found.	Identify logical relationships as well as fallacies in logic. Re-read to check, monitor and evaluate accuracy of original judgments about the text. Determine whether the author of a narrative has succeeded in communicating point of view; in setting an identifiable tone for the selection; in developing a worthwhile	5. Use critical reasoning skills to evaluate written material. This skill includes evaluating the stated or implied assumptions on which the validity of a writer's argument depends; judging the relevance or importance of facts, examples, or graphic data to a writer's argument evaluating the validity of analogies, distinguishing between
5	F1-e	Judge the credibility of a source of information.			

ACT	SCANS	C.B.R.	G.E.D.	F.I.P.S.E.	T.A.S.P.
				plot, characterizations and setting. Determine whether a conclusion or interpretation drawn from the text is reasonable, relevant, and adequately supported by evidence from the text. Determine whether conclusions drawn would appear justified to an informed audience.	fact and opinion; and assessing the credibility or objectivity of the writer or source of written material.
3	F1-a	Use the telephone directory to make local and long distance calls.	*Level 2 Study of the dictionary to learn syllabication accent and diacritical marks such as macron (-), breve (v), double dot and single dot as an aid to pronunciation. Study of road maps, time tables, and entertainment guides to determine distances between cities, report on transportation schedules and discuss merits of available entertainment. Obtain library card and locate books, using index file.	Understand concepts and generalizations including those presented in visual materials such as maps, charts, graphs, and tables. Understand the use of mathem[illegible] notation and det[illegible] ans[illegible] pro[illegible]to mathematical formulations and interpretation of graphs of functions. Selectively note of display relationships of ideas (such as an outline or map) which will serve the purposes set for reading.	6. Apply study skills to reading assignment. This skill includes organizing and summarizing information for study purposes; following written instructions or directions; and interpreting information presented in charts, graphs, or tables.
3	F1-a	Use textbook features, such as index, table of contents, glossaries, etc.			
	F1-B	Recall information accurately from memory.			
3	F1-c	Carry out correctly written or oral instructions.			
3	F1-a	Use a thesaurus.			

ACT	SCANS	C.B.R.	G.E.D.	F.I.P.S.E.	T.A.S.P.
3	F1-a	Read and understand graphs, maps, charts, and tables.	*Level 3 In reference works, utilize dictionary to learn alphabetical order, guide works, diacritical marks, synonyms and antonyms. Use encyclopedia , atlases, magazines, and source books to prepare class assignments.	Summarize key ideas accurately. Draw deductions from information displayed in maps, graphs, and tables.	(6. CONT.)
3	F1-a		*Level 4 Use of reference works such as dictionary, encyclopedia, atlas, thesaurus, manuals, periodicals, newspapers, journals, books, and play reviews. Reading a variety of textbooks; fiction and non-fiction; newspapers; magazines.		



SCANS Writing Report

F2

a) Communicates thoughts, ideas, information, and messages in writing

b) Records information completely and accurately

c) Composes and creates documents such as letters, directions, manuals, reports, proposals, graphs, and flow charts.

d) Uses language, style, organization appropriate to the subject matter, purpose, and audience.

e) Includes supporting documentation and attends to level of detail

f) Checks, edits, and revises for current information, appropriate emphasis, form, grammar, spelling, and punctuation.

General Educational Development (GED):
Level 2: Grade 4-6
Level 3: Grade 7-8
Level 4: Grade 9-12
Level 5: College 1-2

ACT WORK KEYS:

Level 1: Message conveyed inadequately: Overall lack of proper sentence structure.

Level 2: Message conveyed adequately; weak sentence structure; large number of mechanical errors.

Level 3: Message conveyed clearly; most sentences complete; some mechanical errors.

Level 4: Message conveyed clearly; all sentences are complete; may have a few minor mechanical errors; may have a choppy style.

Level 5: Message conveyed clearly; good sentence structure; no mechanical errors; highly appropriate for business setting and situation; smooth, logical style.

WRITING CROSSWALK OF IDENTIFIED SKILL DESCRIPTIONS

ACT	SCANS	Coordinating Board Research	Department of Labor General Educational Development (G.E.D.)	Improvement for Undergraduate Education in Texas: College Level Competencies Fund for the Improvement of Postsecondary Education (F.I.P.S.E.)	Texas Academic Skills Program (T.A.S.P.)
3	F2-d	Use words appropriate for a specific audience and purpose.	*Level 4 Selection of wordage according to subject matter and audience.	Recognize the need to determine the level of detail to achieve a specific purpose. Recognize when ethical, emotional, or logical appeals are needed to achieve a specific purpose. Determine the information needed for the particular occasion. Determine appropriate purpose and rhetorical genre. Evaluate the process by which the information was collected and decide whether more is needed. Synthesize from unorganized data those ideas appropriate to the	1. Elements of Composition a. Recognize purpose and audience. This skill includes recognizing the appropriate purpose, audience, or occasion for a piece of writing; and recognizing writing that is appropriate for various purposes, audiences, or occasions.

ACT	SCANS	C.B.R	G.E.D.	F.I.P.S.E.	T.A.S.P.
				writing purpose, audience, and occasion.	
5	F2-f+	No close match found.	*Level 5 Study of the principles of inductive and deductive reasoning such as testing evidence, validity of generalizations, and cause and effect relationships to detect fallacies in arguments and to avoid these errors in own writing. (also in reading IIB, 4)	Recognize when information is readily available from personal experiences, readings, lectures, speeches or observations. Recognize when necessary information must come from other sources--a library or non-print sources including interviews or experimentation. Recognize when necessary information must be acquired through analysis of library work or other works of art. Organize those ideas into a logical and cohesive arrangement consistent with purpose, audience, and occasion. Develop an initial draft in which a controlling idea is supported in a unified and focused manner.	b. Recognize unity, focus, and development in writing. This skill includes recognizing unnecessary shifts in point of view or distracting details that impair the development of the main idea in a piece of writing and recognizing revisions that improve the unity and focus of a piece of writing.

ACT	SCANS	C.B.R	G.E.D.	F.I.P.S.E.	T.A.S.P.
				Re-evaluate the argument; eliminate any logical fallacies; clarify the distinction between fact and opinion.	
3	F2-a	Organize ideas in essay form.	*Level 5 Develop a sequential and descriptive style of writing. Study and application of theory of dramatic writing. Develop a free and independent skill in writing, based on own knowledge and experience. Study of the Collection, arrangement, and expression of subject matter to persuade or instill an acceptance of ideas in the mind of the reader. Analysis and practice of expository techniques with emphasis on organization of material and development of unity.	Use techniques such as looping, listing, or brainstorming to generate ideas. Use systems such as rhetorical topics, pentad, or cubing to explore knowledge of a subject. Develop an initial draft in which a controlling idea is supported in a unified and focused manner. Provide transitions among various components. Re-evaluate the organization; determine whether the text has been effectively presented and adequately elaborated.	c. Recognize effective organization in writing. This skill includes methods of paragraph organization and the appropriate use of transitional words or phrases to convey text structure, and reorganizing sentences to improve cohesion and the effective sequence of ideas (coherence, logical order, transition)
3	F2-c	Compose logical and understandable correspondence and reports.			
4	F2-a	Interpret ideas in terms of one's own viewpoint or values.			
4	F2-a	State one's position in a clear, logical manner.			
5	F2-e	Defend one's point of view convincingly.			
3	F2-e	Compile materials supplied by others into a single report.			
2	F2-e	Combine sentences through logical subordination.			
3	F2-e	Compile notes taken from several sources into a documented report.			

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ACT	SCANS	C.B.R	G.E.D.	F.I.P.S.E.	T.A.S.P.
3	F2-f	Use words effectively that indicate a transition from one idea to another.			
3	F2-f	Distinguish between complete sentences and fragments.	*Level 2 Learn to use mature sentence forms (compound and complex) with variation of word order in phrases, clauses, and sentences. Introduction to compound subject and predicate; agreement of subject and verb. Write reports on class discussions, hobbies, and trips, with *emphasis on variety of sentence structure, grammar, selection of words to clearly express thought, and reinforcing and increasing vocabulary*. Make outlines; practice techniques of letter writing and news writing.	Incorporate language and style appropriate to a given purpose, audience, and occuasion. Re-evaluate the style; carry out necessary revisions including attention to matters of cohesion, consistency of point of view, appropriate language, and effective sentence structure.	2. Sentence Structure, Usage, and Mechanics a. Recognize effective sentences. This skill includes recognizing ineffective repetition and inefficiency in sentence con-struction; identifying sentence fragments and run-on sentences; identifying standard subject-verb agreement; identifying standard placement of modifiers, parallel structure, and use of negatives in sentence formation; and recognizsing imprecise and inappropriate word choice.
3	F2-f	Use verbs that agree with subjects.			
3	F2-c	Construct a logical outline.			
3	F2-f	Use correct idioms.			
3	F2-a	Write clear, correct statements to fill out forms accurately.			
3	F2-f	Use words effectively which are opposite of one another.			
3	F2-f	Add proper beginnings and endings to words to change their meanings.			
3	F2-f	Use varied sentence structure.			
3	F2-f	Use appropriately words often confused because of similar sounds.			

ACT	SCANS	C.B.R	G.E.D.	F.I.P.S.E.	T.A.S.P.
3	F2-f	Use citations correctly.	*Level 3		
5	F2-f	Review and edit others' correspondence, directions, and reports.	Prepare themes, reports, and essays, with greater emphasis placed on punctuation, spelling, grammar, format, style, neatness, arrangement, and comprehensive coverage of subject matter.		
5	F2-f		Learn normal inverted word order, contractions, agreement of subject and verbs.		
			*Level 4		
4	F2-f		Mastery and facility in the use of the rules and concepts of person, gender, number, case, tense and mood.		
4	F2-f		Adjectives: common, proper, descriptive, limiting, articles position in sentence; comparative degrees.		
4	F2-f		Preparation of outlines; preparation of themes, emphasizing length, harmony, sequence, and variety of sentences and paragraph structure.		

ACT	SCANS	C.B.R	G.E.D.	F.I.P.S.E.	T.A.S.P.
4	F2-f		Coordination, subordination and parallelism of thoughts.		
			*Level 2	Create and sustain the interest of the reader by effective stylistic decisions in diction, usage, and sentence structure. Proofread for adherence to convenrtions of edited American English.	b. Recognize edited American English usage. This skill includes recognizing the standard use of verb forms and pronouns; recognizing the standadrd formation and use of adverbs, adjectives, comparatives, superlatives, and plural and possessive forms of nouns; and recognizing standard punctuation.
3	F2-f	Using plural words correctly.	Punctuation of the apostrophe, hyphen, and colon.		
3	F2-f	Use of appropriate contractions with apostrophe.	Introduction to comparison of objectives and advarbs; common and proper nouns; personal pronouns, singular and plural forms.		
3	F2-f	Punctuate one's own correcpondence.			
3	F2-f	Use apostrophes correctly to show the possessive form of nouns.			
3	F2-f	Use the correct tenses of verbs.			
3	F2-f	Capitalize words correctly.	*Level 3		
3	F2-f	Spell correctly.	Punctuation: Comma, colon, semi-colon, dash, parentheses, quotation marks, hyphen, abbreviations.		
4	F2-f	Use correct abbreviations of words.			
4	F2-f	Distinguish between homonyms.	Learn to diagram sentences.		

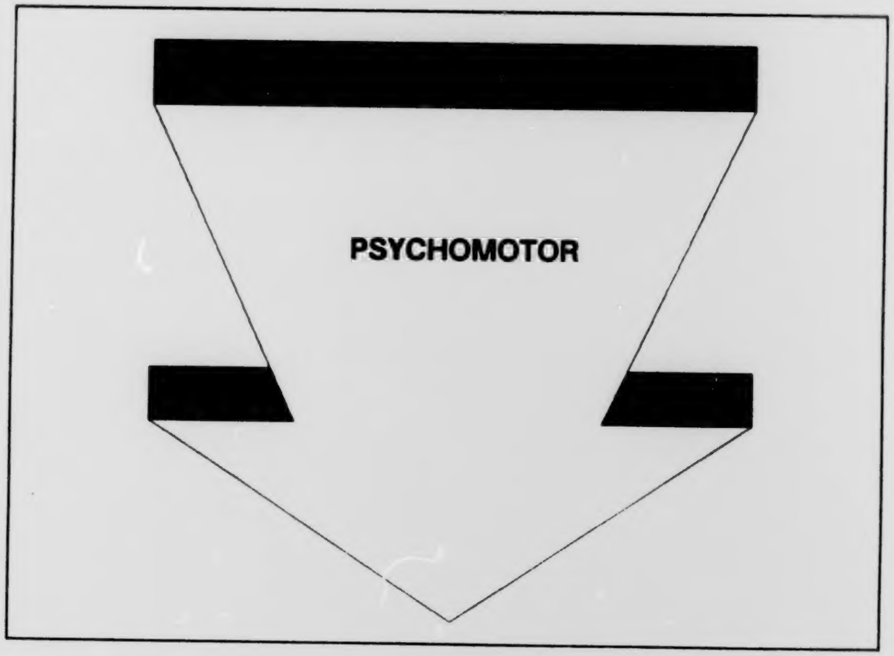
ACT	SCANS	C.B.R	G.E.D.	F.I.P.S.E.	T.A.S.P.
5	F2-f	Use appropriate definitions for words with more than one meaning.	Learn pronouns, and antecedents.		
5	F2-f		Learn concepts of person, gender, number, case, tense, mood, and voice.		
5	F2-f		Learn kinds of verbs, nouns, pronouns, adjectives, adverbs, conjunctions, prepositions.		
			*Level 4		
4	F2-4		*Parts of Speech:* Verbs: strong and weak, transitive and intransitive, auxiliary, regular. Conjugation. Nouns: Common and proper, collective, concrete and abstract inflections, gender. Pronouns: Personal, demonstrative, relative, numerical, reciprocal.		

ACT	SCANS	C.B.R	G.E.D.	F.I.P.S.E.	T.A.S.P.
			Adverbs: Simple, conjunctive; forms; comparisons.		
			Conjunctions: Coordinating, subordinating		
			Prepositions.		
			Interjections.		
			Review and mastery of all rules of punctuation and capitalization.		

TABLE F

TASK ANALYSIS CROSSWALK

PSYCHOMOTOR



PSYCHOMOTOR

DC CIRCUITS

104

103

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function: All

Competency: *Fabricate and demonstrate DC series circuits. (B.11)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/skills required)
Performance Skills						
Tasks: 1. Explain a series circuit.			ACT Level 4 SCANS F1-b	ACT Level 5 SCANS F3-a, F4-c	ACT Level 4 SCANS: Thinking Skills: All Personal Qualities: All	**Resources**: **Time**: Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems;monitors/ corrects performance; improves;Technology: Selects/Applies**
2. Calculate total resistance, total current and the polarity of the IR drops in series circuits.			SAME	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: SAME	
3. Explain the difference between a voltage rise and a voltage drop, and the use of ground as a reference point.			SAME	SAME	SAME	
4. Analyze the use of voltage dividers or alternators to provide several different voltages from one source.			SAME	SAME	SAME	
5. Explain the power distribution rules for series circuits.			SAME	SAME	SAME	
6. Analyze the effects of internal resistance on maximum power transfer from source to load.						
7. Construct series circuits to verify calculations.						

*(Build the product/device/circuit and show that it performs as expected.)

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Occupation: Electronic Technician
Duty Area/Function: All

Task Analysis Worksheet

Competency: *Troubleshoot DC series circuit. (B.12)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/skills required)
Performance Skills						
Test to: 1. Assembly component level 2. Board level 3. Component level Tasks: 1. Test a. power sources b. passive circuit elements 2. Measure a. current b. power c. resistance d. voltage 3. Analyze problem			ACT Level 4 SCANS F1-b	ACT Level 5 SCANS F3 & F4	ACT Level 6 SCANS: Thinking Skills: All Personal Qualities: All	**Resources: Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership:** communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information:** Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems;monitors/ corrects performance; improves; Technology: Selects/Applies/** Maintains/troubleshoots

*(Use a logical process to find the fault(s) in a product/device/circuit, replace and/or repair the defect and demonstrate corrected operation.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function: All

Competency: *Fabricate and demonstrate DC parallel circuits. (B.14)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks:						**Resources: Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal: Team:** Participates as team; **teaches others; Leadership:**communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information:** Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems;monitors/ corrects performance; improves;Technology: Selects/Applies**
1. Define/explain a parallel circuit.			ACT Level 4 SCANS F1-b	ACT Level 5 SCANS F3 & F4	ACT Level 4 SCANS: Thinking Skills: All Personal Qualities: All	
2. Calculate total current in parallel circuits.			SAME	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: SAME	
3. Calculate total resistance in parallel circuits			SAME	SAME	SAME	
4. Analyze power distribution in parallel circuits.			SAME	SAME	SAME	
5. Construct parallel circuits and make measurements to verify previous calculations.			SAME	SAME	SAME	

*(Build the product/device/circuit and show that it performs as expected.)

110

Occupation: Electronic Technician
Duty Area/Function: All

Task Analysis Worksheet

Competency: *Troubleshoot and repair DC parallel circuits. (B.15)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks:						**Resources: Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal: Team:** Participates as team; **teaches others; Leadership:**communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems;monitors/ corrects performance; improves;Technology:** Selects/Applies
1. Define/explain a parallel circuit.			ACT Level 4 SCANS F1-b	ACT Level 5 SCANS F3 & F4	ACT Level 4 SCANS: Thinking Skills: All Personal Qualities: All	
2. Calculate total current in parallel circuits.			SAME	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: SAME	
3. Calculate total resistance in parallel circuits			SAME	SAME	SAME	
4. Analyze power distribution in parallel circuits.			SAME	SAME	SAME	
5. Construct parallel circuits			SAME	SAME	SAME	
5. Make measurements to verify previous calculations.			SAME	SAME	SAME	
6. Explain the effects of opens in parallel circuits. (Troubleshooting)			SAME	SAME	SAME	
7. Explain the effects of shorts in parallel circuits. (Troubleshooting)			SAME	SAME	SAME	

*(Use a logical process to find the fault(s) in a product/device/circuit, replace and/or repair the defect and demonstrate corrected operation.)

Occupation: Electronic Technician
Duty Area/Function: All

Task Analysis Worksheet

Competency: *Fabricate and demonstrate DC series-parallel and bridge circuits. (B.17)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks:						
1. Identify/explain a series-parallel arrangement of components.			ACT Level 4 SCANS F1-b	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	**Resources: Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership:**communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information:** Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems;monitors/ corrects performance; improves;Technology: Selects/Applies**
2. Simplify components into a single equivalent resistance.			SAME	SAME	SAME	
3. Analyze a series-parallel circuit			SAME	SAME	SAME	
4. Make calculations to determine total resistance.			SAME	SAME	SAME	
5. Make calculations to determine voltage and current distribution.			SAME	SAME	SAME	
6. Construct series-parallel circuits.			SAME	SAME	SAME	
7. Make measurements to verify calculations.			SAME	SAME	SAME	

*(Build the product/device/circuit and show that it performs as expected.)

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Occupation: Electronic Technician
Duty Area/Function: All

Task Analysis Worksheet

Competency: *Troubleshoot and repair DC series-parallel and bridge circuits. (B.18)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks:						**Resources: Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership:**communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems;monitors/ corrects performance; improves; Technology: Selects/ Applies/maintains/ troubleshoots**
1. Identify/explain a series parallel arrangement of components.			ACT Level 4 SCANS F1-b	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	
2. Simplify components into a single equivalent resistance.			SAME	SAME	SAME	
3. Analyze a series parallel circuit			SAME	SAME	SAME	
4. Make calculations to determine total resistance.			SAME	SAME	SAME	
5. Make calculations to determine voltage and current distribution.			SAME	SAME	SAME	
6. Analyze the effects of opens in series parallel circuits (Troubleshooting)			SAME	SAME	SAME	
7. Analyze the effects of shorts in series parallel circuits (Troubleshooting)			SAME	SAME	SAME	

*(Use a logical process to find the fault(s) in a product/device/circuit, replace and/or repair the defect and demonstrate corrected operation.)

Occupation: Electronic Technician
Duty Area/Function: All

Task Analysis Worksheet

Competency: *Fabricate and demonstrate DC voltage divider circuits (Loaded and Unloaded) (B.20)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks:						**Resources**: **Time**: Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others;** **Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems;monitors/ corrects performance; improves;Technology: Selects/Applies**
1. Identify/explain a series-parallel arrangement of components.			ACT Level 4 SCANS F1-b	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	
2. Simplify components into a single equivalent resistance.			SAME	SAME	SAME	
3. Analyze a series-parallel circuit			SAME	SAME	SAME	
4. Make calculations to determine total resistance.			SAME	SAME	SAME	
5. Make calculations to determine voltage and current distribution.			SAME	SAME	SAME	
6. Construct series-parallel circuits.			SAME	SAME	SAME	
7. Make measurements to verity calculations.			SAME	SAME	SAME	

*(Build the product/device/circuit and show that it performs as expected.)

Occupation: Electronic Technician
Duty Area/Function: All

Task Analysis Worksheet

Competency: *Troubleshoot and repair DC voltage divider circuits (Loaded and Unloaded) (B.21)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks: 1. Identify/explain a series-parallel arrangement of components.			ACT Level 4 SCANS F1-b	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	**Resources**: Time: Selects goal relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/ Facility:** Acquires, stores, uses materials efficiently; **Interpersonal: Team:** Participates as team; **teaches others; Leadership:**communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems;monitors/ corrects performance; improves;Technology: Selects/Applies/ maintains/troubleshoots**
2. Simplify components into a single equivalent resistance.			SAME	SAME	SAME	
3. Analyze a series-parallel circuit			SAME	SAME	SAME	
4. Make calculations to determine total resistance.			SAME	SAME	SAME	
5. Make calculations to determine voltage and current distribution.			SAME	SAME	SAME	
6. Analyze the effects of opens in series parallel circuits (Troubleshooting)			SAME	SAME	SAME	
7. Analyze the effects of shorts in series parallel circuits (Troubleshooting)			SAME	SAME	SAME	

*(Use a logical process to find the fault(s) in a product/device/circuit, replace and/or repair the defect and demonstrate corrected operation.)

Occupation: Electronic Technician

Duty Area/Function: All

Competency: *Fabricate and demonstrate DC RC and RL circuits.(B.23)

Task Analysis Worksheet

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal & systems competencies/skills required)
Performance Skills						
Tasks:1. Calculate time constants for RC circuits.			ACT Level 4 SCANS F1-b	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	**Resources: Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/ Facility:** Acquires, stores, uses materials efficiently; **Interpersonal:Team:** Participates as team; **teaches others; Leadership:**communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information:** Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems;monitors/ corrects performance; improves;Technology: Selects/Applies/maintains**
2. Calculate charge/discharge times for RC circuits.			SAME	SAME	SAME	
3. Calculate the effects of R and C on charging time.			SAME	SAME	SAME	
4. Graph the different charging times based on time constants.			SAME	SAME	SAME	
5. Graph the different charging times based on voltage amplitude.			SAME	SAME	SAME	
6. Calculate time constants for RL circuits.			SAME	SAME	SAME	
7. Explain the voltage transients produced in RL circuits.			SAME	SAME	SAME	
8. Analyze the universal time constant curve.			SAME	SAME	SAME	
9. Explain the universal time constant curve application to the study of RC and RL time constant circuits.			SAME	SAME		
10.Document the effects of long and short time constants on square wave voltages.			SAME	SAME	SAME	

Occupation: Electronic Technician
Duty Area/Function: All
Competency: *Troubleshoot and repair DC RC and RL circuits. (B.24)

Task Analysis Worksheet

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks:						**Resources: Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/ Facility:** Acquires, stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership:**communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems;monitors/ corrects performance; improves;Technology: Selects/Applies/ maintains/trouble-shoots**
1. Identify/explain a series-parallel arrangement of components.			ACT Level 4 SCANS F1 b	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	
2. Simplify components into a single equivalent resistance.			SAME	SAME	SAME	
3. Analyze a series-parallel circuit			SAME	SAME	SAME	
4. Make calculations to determine total resistance.			SAME	SAME	SAME	
5. Make calculations to determine voltage and current distribution.			SAME	SAME	SAME	
6. Analyze the effects of opens in series parallel circuits (Troubleshooting)			SAME	SAME	SAME	
7. Analyze the effects of shorts in series parallel circuits (Troubleshooting)			SAME	SAME	SAME	

*(Use a logical process to find the fault(s) in a product/device/circuit, replace and/or repair the defect and demonstrate corrected operation.)

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AC CIRCUITS

Occupation: Electronic Technician
Duty Area/Function:

Task Analysis Worksheet

Competency: *Fabricate and demonstrate AC capacitive circuits. (C.08)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks: 1. Construct capacitive circuits.			ACT Level 4 SCANS F1-b	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	**Resources: Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal: Team:** Participates as team; **teaches others; Leadership:**communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems;improves; Technology: Selects/Applies**
2. Measure currents.			SAME	SAME	SAME	
3. Measure voltage.			SAME	SAME	SAME	
4. Measure reactance.			SAME	SAME	SAME	

*(Build the product/device/circuit and show that it performs as expected.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:

Competency: *Troubleshoot and repair AC capacitive circuits. (C.09)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks: 1. Calculate capacitive reactance.			ACT Level 4 SCANS F1-b	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	**Resources**: **Time**: Selects goal relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/ Facility:** Acquires, stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others;** **Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems;improves;** **Technology:** **Selects/Applies**/maintains/troubleshoots
2. Calculate total reactances for series circuits.			SAME	SAME		
3. Calculate total reactances for parallel circuits.			SAME	SAME	SAME	
4. Graph the relationship between capacitive reactance and frequency.			SAME	SAME	SAME	
5. Determine the phase relationship between voltage and current in a capacitive circuit.			SAME	SAME	SAME	
6. Evaluate power in a purely capacitive circuit.			SAME	SAME	SAME	
7. Manipulate equations and solve problems associated with reactive circuits.			SAME	SAME	SAME	
8. Construct capacitive circuits.			SAME	SAME	SAME	
9. Measure currents.			SAME	SAME	SAME	
10.Measure voltage.			SAME	SAME	SAME	
11.Measure reactance.			SAME	SAME	SAME	
12.Simulate opens and shorts.			SAME	SAME	SAME	

*(Use a logical process to find the fault(s) in a product/device/circuit, replace and/or repair the defect and demonstrate corrected operation.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:

Competency: *Fabricate and demonstrate AC inductive circuits. (C.11)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks: 1. Construct inductive circuits			ACT Level 4 SCANS F1-b	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	**Resources: Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership:**communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems;improves; Technology: Selects/Applies**/maintains/troubleshoots
2. Measure currents.			SAME	SAME	SAME	
3. Measure voltage.			SAME	SAME	SAME	
4. Measure reactance.			SAME	SAME	SAME	

*(Build the product/device/circuit and show that it performs as expected.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:

Competency: *Fabricate and demonstrate AC inductive circuits. (C.11)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks: 1. Construct inductive circuits			ACT Level 4 SCANS F1-b	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	**Resources: Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership:**communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information:** Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems;improves; Technology: Selects/Applies**/maintains/troubleshoots
2. Measure currents.			SAME	SAME	SAME	
3. Measure voltage.			SAME	SAME	SAME	
4. Measure reactance.			SAME	SAME	SAME	

*(Build the product/device/circuit and show that it performs as expected.)

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Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:

Competency: *Troubleshoot and repair AC inductive circuits. (C.12)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks:						**Resources:** Time: Selects goal relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership:**communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information:** Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems;improves;** **Technology:** **Selects/Applies/**maintains/troubleshoots
1. Construct inductive circuits			ACT Level 4 SCANS F1-b	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	
2. Measure currents.			SAME	SAME	SAME	
3. Measure voltage.			SAME	SAME	SAME	
4. Measure reactance.			SAME	SAME	SAME	
5. Simulate faults			SAME	SAME	SAME	

*(Use a logical process to find the fault(s) in a product/device/circuit, replace and/or repair the defect and demonstrate corrected operation)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:

Competency: *Fabricate and demonstrate AC circuits using transformers. (C.14)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks:					ACT Level 5 SCANS:	**Resources:** Time: Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others;** **Leadership:**communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information:** Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems;improves;** **Technology:** **Selects/Applies**/maintains/troubleshoots
1. Explain principles of mutual inductance			ACT Level 4 SCANS F1-b	ACT Level 6 SCANS F3 & F4	Thinking Skills: All Personal Qualities: All	
2. Explain coefficient of coupling			SAME	SAME	SAME	
3. Calculate turns ratio for current						
4. Calculate turns ratio for voltage			SAME	SAME	SAME	
5. Calculate turns ratio for impedance			SAME	SAME	SAME	
6. Determine losses (core, current)			SAME	SAME	SAME	

*(Build the product/device/circuit and show that it performs as expected)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:

Competency: *Troubleshoot and repair AC circuits using transformers. (C.15)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks: Apply principles of:					ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	Resources: Time: Selects goal relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others;** **Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information:** Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems;improves;** **Technology:** **Selects/Applies**/maintains/troubleshoots
1. Compare relationship of voltage, current, power and impedance to turns ratios.			ACT Level 4 SCANS F1-b	ACT Level 6 SCANS F3 & F4		
2. Calculate the various losses of transformers and inductors.			SAME	SAME	SAME	
3. Differentiate between core types.			SAME	SAME	SAME	
4. Differentiate between the application of each type.			SAME	SAME	SAME	
5. Identify the symbols for each core type.			SAME	SAME	SAME	
6. Analyze the loading effect.			SAME	SAME	SAME	
7. Analyze the impedance transformation characteristics.			SAME	SAME	SAME	
8. Analyze the characteristics of Radio Frequency Transformers.			SAME	SAME	SAME	
9. Analyze the applications of Radio Frequency Transformers.			SAME	SAME	SAME	
10. Explain the Transformer Connections for Three Phase Circuits.			SAME	SAME	SAME	

*(Use a logical process to find the fault(s) in a produce/device/circuit, replace and/or repair the defect and demonstrate corrected operation)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:
Competency: *Fabricate and demonstrate AC differentiator and integrator circuits (C.17)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, infor mation, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks: 1. Calculate time constants for RC circuits.			ACT Level 4 SCANS F1-b	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	Resources: Time: Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/ Facility:** Acquires, stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information Systems: **understands systems;monitors/ corrects performance; improves;****Technology:** **Selects/Applies/maintains**
2. Calculate charge/discharge times for RC circuits.			SAME	SAME	SAME	
3. Calculate the effects of R and C on charging time.			SAME	SAME	SAME	
4. Graph the different charging times based on time constants.			SAME	SAME	SAME	
5. Graph the different charging times based on voltage amplitude.			SAME	SAME	SAME	
6. Calculate time constants for RL circuits.			SAME	SAME	SAME	
7. Explain the voltage transients produced in RL circuits.			SAME	SAME	SAME	
8. Analyze the universal time constant curve.			SAME	SAME	SAME	
9. Explain the universal time constant curve application to the study of RC and RL time constant circuits.			SAME	SAME	SAME	
10. Document the effects of long and short time constants on square wave voltages.			SAME	SAME	SAME	
11. Construct circuits to verify the calculated RC and RL time constants.			SAME	SAME	SAME	

*(Build the product/device/circuit and show that it performs as expected)

Occupation: Electronic Technician

Task Analysis Worksheet

Duty Area/Function:

Competency: *Troubleshoot and repair AC differentiator and integrator circuits (C.18)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks: 1. Calculate time constants for RC circuits.			ACT Level 4 SCANS F1-b	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	**Resources: Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership:**communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information:** Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems;monitors/ corrects performance; improves;Technology: Selects/Applies/maintains**
2. Calculate charge/discharge times for RC circuits.			SAME	SAME	SAME	
3. Calculate the effects of R and C on charging time.			SAME	SAME	SAME	
4. Graph the different charging times based on time constants.			SAME	SAME	SAME	
5. Graph the different charging times based on voltage amplitude.			SAME	SAME	SAME	
6. Calculate time constants for RL circuits.			SAME	SAME	SAME	
7. Explain the voltage transients produced in RL circuits.			SAME	SAME	SAME	
8. Analyze the universal time constant curve.			SAME	SAME	SAME	
9. Explain the universal time constant curve application to the study of RC and RL time constant circuits.			SAME	SAME	SAME	
10. Document the effects of long and short time constants on square wave voltages.			SAME	SAME	SAME	
11. Construct circuits to verify the calculated RC and RL time constants.			SAME	SAME	SAME	

*(Use a logical process to find the fault(s) in a product/device/circuit, replace and/or repair the defect and demonstrate corrected operation)

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Occupation: Electronic Technician
Duty Area/Function:

Task Analysis Worksheet

Competency: *Fabricate and demonstrate AC series and parallel resonant circuits (C.20)(PAGE 1 OF 2)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks:						
1. Explain Resonance.			ACT Level 4 SCANS F1-b	ACT Level 5 SCANS F3 & F4	ACT Level 4 SCANS: Thinking Skills: All Personal Qualities: All	**Resources: Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership:** communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information:** Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/corrects performance; improves; Technology:** Selects/ Applies/maintains
2. Analyze Series Resonant Circuits including the basic characteristics.			SAME	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: SAME	
3. Evaluate the Q of a resonant circuit and its effects on the circuit including how it may be changed.			SAME	SAME	SAME	
4. Evaluate the Q effects on circuit bandwidth.			SAME	SAME	SAME	
5. Explore the concepts of an Ideal Parallel Resonant Circuit.			SAME	SAME	SAME	
6. Compare the concepts of an Ideal Parallel Resonant Circuit to a Practical Parallel Resonant Circuit.			SAME	SAME	SAME	
7. Analyze Parallel Resonant Circuits.			SAME	SAME	SAME	
8. Compare Parallel Resonant Circuits with Series Resonant Circuits.			SAME	SAME	SAME	
9. Analyze the effects of dampening a parallel resonant circuit including how it affects the Q and bandwidth of the circuit.			SAME	SAME	SAME	

*(Build the product/device/circuit and show that it performs as expected)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:

Competency: *Fabricate and demonstrate AC series and parallel resonant circuits (C.20)(PAGE 2 OF 2)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks: 10. Analyze the frequency response curves of a resonant circuit.			ACT Level 4 SCANS F1-b	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	**Resources**: **Time**: Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility**: Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others;** **Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity**: works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/corrects performance; improves;** **Technology**: Selects/ **Applies/maintains**
11. Analyze the Bandwidth of a resonant circuit.			SAME	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: SAME	
12. Analyze the Bandpass of a resonant circuit.			SAME	SAME	SAME	
13. Analyze the relative amplitudes of the voltages, currents and impedances used to establish the limits of the curves.			SAME	SAME	SAME	
14. Evaluate Tuning, Bandspreading and the advantages of Multiple Tuned Stages.			SAME	SAME	SAME	
15. Construct circuit for both series/parallel resonant circuit.			SAME	SAME	SAME	
16. Measure current, voltages to establish frequency response curves.			SAME	SAME	SAME	

*(Build the product/device/circuit and show that it performs as expected)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:

Competency: *Troubleshoot and repair AC series and parallel resonant circuits (C.21)(PAGE 1 OF 2)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks:						
1. Explain Resonance.			ACT Level 4 SCANS F1-b	ACT Level 5 SCANS F3 & F4	ACT Level 4 SCANS: Thinking Skills: All Personal Qualities: All	**Resources: Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership:**communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information:** Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/corrects performance; improves; Technology: Selects/ Applies/maintains**
2. Analyze Series Resonant Circuits including the basic characteristics.			SAME	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: SAME	
3. Evaluate the Q of a resonant circuit and its effects on the circuit including how it may be changed.			SAME	SAME	SAME	
4. Evaluate the Q effects on circuit bandwidth.			SAME	SAME	SAME	
5. Explore the concepts of an Ideal Parallel Resonant Circuit.			SAME	SAME	SAME	
6. Compare the concepts of an Ideal Parallel Resonant Circuit to a Practical Parallel Resonant Circuit.			SAME	SAME	SAME	
7. Analyze Parallel Resonant Circuits.			SAME	SAME	SAME	
8. Compare Parallel Resonant Circuits with Series Resonant Circuits.			SAME	SAME	SAME	
9. Analyze the effects of dampening a parallel resonant circuit including how it affects the Q and bandwidth of the circuit.			SAME	SAME	SAME	

*(Use a logical process to find the fault(s) in a product/device/circuit, replace and/or repair the defect and demonstrate corrected operation)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:

Competency: *Troubleshoot and repair AC series and parallel resonant circuits (C.21) (PAGE 2 OF 2)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks: 10. Analyze the frequency response curves of a resonant circuit.			ACT Level 4 SCANS F1-b	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	**Resources:** Time: Selects goal relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others;** **Leadership:**communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information:** Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems;monitors/ corrects performance; improves;Technology: Selects/Applies/maintains**
11. Analyze the Bandwidth of a resonant circuit.			SAME	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: SAME	
12. Analyze the Bandpass of a resonant circuit.			SAME	SAME	SAME	
13. Analyze the relative amplitudes of the voltages, currents and impedances used to establish the limits of the curves.			SAME	SAME	SAME	
14. Evaluate Tuning, Bandspreading and the advantages of Multiple Tuned Stages.			SAME	SAME	SAME	
15. Construct circuit for both series/parallel resonant circuit.			SAME	SAME	SAME	
16. Measure current, voltages to establish frequency response curves.			SAME	SAME	SAME	
17. Simulate faults.			SAME	SAME	SAME	

*(Use a logical process to find the fault(s) in a product/device/circuit, replace and/or repair the defect and demonstrate corrected operation)

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Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:

Competency: *Fabricate and demonstrate AC RC, RL, and RLC circuits. (C.23)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks:						Resources: Time: Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; Material/Facility: Acquires,stores, uses materials efficiently; Interpersonal: Team: Participates as team; teaches others; Leadership:communicates ideas to justify position, persuades/ convinces;responsibly challenges; Works with Diversity: works with others; Information: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information Systems: understands systems; monitors/corrects performance; improves; Technology: Selects/ Applies/maintains
10. Analyze the frequency response curves of a resonant circuit.			ACT Level 4 SCANS F1-b	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	
11. Analyze the Bandwidth of a resonant circuit.			SAME	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: SAME	
12. Analyze the Bandpass of a resonant circuit.			SAME	SAME	SAME	
13. Analyze the relative amplitudes of the voltages, currents and impedances used to establish the limits of the curves.			SAME	SAME	SAME	
14. Evaluate Tuning, Bandspreading and the advantages of Multiple Tuned Stages.			SAME	SAME	SAME	
15. Construct circuit for both series/parallel resonant circuit.			SAME	SAME	SAME	
16. Measure current, voltages to establish frequency response curves.			SAME	SAME	SAME	

*(Build the product/device/circuit and show that it performs as expected.)

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Occupation: Electronic Technician
Duty Area/Function:

Task Analysis Worksheet

Competency: *Troubleshoot and repair AC RC, RL, and RLC circuits. (C.24)(Page 1 of 2)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks:						**Resources: Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/corrects performance; improves; Technology: Selects/ Applies/maintains**
1. Explain Resonance.			ACT Level 4 SCANS F1-b	ACT Level 5 SCANS F3 & F4	ACT Level 4 SCANS: Thinking Skills: All Personal Qualities: All	
2. Analyze Series Resonant Circuits including the basic characteristics.			SAME	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: SAME	
3. Evaluate the Q of a resonant circuit and its effects on the circuit including how it may be changed.			SAME	SAME	SAME	
4. Evaluate the Q effects on circuit bandwidth.			SAME	SAME	SAME	
5. Explore the concepts of an Ideal Parallel Resonant Circuit.			SAME	SAME	SAME	
6. Compare the concepts of an Ideal Parallel Resonant Circuit to a Practical Parallel Resonant Circuit.			SAME	SAME	SAME	
7. Analyze Parallel Resonant Circuits.			SAME	SAME	SAME	
8. Compare Parallel Resonant Circuits with Series Resonant Circuits.			SAME	SAME	SAME	
9. Analyze the effects of dampening a parallel resonant circuit including how it affects the Q and bandwidth of the circuit.			SAME	SAME	SAME	

*(Use a logical process to find the fault(s) in a product/device/circuit, replace and/or repair the defect and demonstrate corrected operation.)

Occupation: Electronic Technician
Duty Area/Function:

Task Analysis Worksheet

Competency: *Troubleshoot and repair AC RC, RL and RLC circuits (C.24) (Page 2 of 2)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks:						
10. Analyze the frequency response curves of a resonant circuit.			ACT Level 5 SCANS F1-b	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	**Resources**: Time: Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership:**communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/corrects performance; improves; Technology:** Selects/ Applies/maintains
11. Analyze the Bandwidth of a resonant circuit.			SAME	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: SAME	
12. Analyze the Bandpass of a resonant circuit.			SAME	SAME	SAME	
13. Analyze the relative amplitudes of the voltages, currents and impedances used to establish the limits of the curves.			SAME	SAME	SAME	
14. Evaluate Tuning, Bandspreading and the advantages of Multiple Tuned Stages.			SAME	SAME	SAME	
15. Construct circuit for both series/parallel resonant circuit.			SAME	SAME	SAME	
16. Measure current, voltages to establish frequency response curves.			SAME	SAME	SAME	

*(Use a logical process to find the fault(s) in a product/device/circuit, replace and/or repair the defect and demonstrate corrected operation.)

Occupation: Electronic Technician
Duty Area/Function:

Task Analysis Worksheet

Competency: *Fabricate and demonstrate AC frequency selective filter circuits. (C.26)(Page 1 of 2)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks:						**Resources: Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership:**communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information:** Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/corrects performance; improves; Technology: Selects/ Applies/maintains**
1. Explain Resonance.			ACT Level 5 SCANS F3 & F4	ACT Level 6 SCANS F3 & F4	ACT Level 4 SCANS: Thinking Skills: All Personal Qualities: All	
2. Analyze Series Resonant Circuits including the basic characteristics.			SAME	SAME	ACT Level 5 SCANS: SAME	
3. Evaluate the Q of a resonant circuit and its effects on the circuit including how it may be changed.			SAME	SAME	SAME	
4. Evaluate the Q effects on circuit bandwidth.			SAME	SAME	SAME	
5. Explore the concepts of an Ideal Parallel Resonant Circuit.			SAME	SAME	SAME	
6. Compare the concepts of an Ideal Parallel Resonant Circuit to a Practical Parallel Resonant Circuit.			SAME	SAME	SAME	
7. Analyze Parallel Resonant Circuits.			SAME	SAME	SAME	
8. Compare Parallel Resonant Circuits with Series Resonant Circuits.			SAME	SAME	SAME	
9. Analyze the effects of dampening a parallel resonant circuit including how it affects the Q and bandwidth of the circuit.			SAME	SAME	SAME	

*(Build the product/device/circuit and show that it performs as expected)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:

Competency: *Fabricate and demonstrate AC series and parallel resonant circuits (C.26)(PAGE 2 OF 2)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks: 10. Analyze the frequency response curves of a resonant circuit.			ACT Level 5 SCANS F3 & F4	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	**Resources**: **Time**: Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/ Facility:** Acquires, stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership:**communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/ corrects performance; improves; Technology:** Selects/ Applies/maintains
11. Analyze the Bandwidth of a resonant circuit.			SAME	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: SAME	
12. Analyze the Bandpass of a resonant circuit.			SAME	SAME	SAME	
13. Analyze the relative amplitudes of the voltages, currents and impedances used to establish the limits of the curves.			SAME	SAME	SAME	
14. Evaluate Tuning, Bandspreading and the advantages of Multiple Tuned Stages.			SAME	SAME	SAME	
15. Construct circuit for both series/parallel resonant circuit.			SAME	SAME	SAME	
16. Measure current, voltages to establish frequency response curves.			SAME	SAME	SAME	

***(Build the product/device/circuit and show that it performs as expected)**

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:

Competency: ***Troubleshoot and repair AC frequency selective filter circuits. (C.27)(Page 1 of 2)**

Technology Performance Skills	Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Tasks:					**Resources: Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others;** **Leadership:**communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information:** Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems;monitors/ corrects performance; improves;** **Technology:** **Selects/ Applies/maintains**
1. Explain Resonance.		ACT Level 5 SCANS F3 & F4	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	
2. Analyze Series Resonant Circuits including the basic characteristics.		SAME	SAME	SAME	
3. Evaluate the Q of a resonant circuit and its effects on the circuit including how it may be changed.		SAME	SAME	SAME	
4. Evaluate the Q effects on circuit bandwidth.		SAME	SAME	SAME	
5. Explore the concepts of an Ideal Parallel Resonant Circuit.		SAME	SAME	SAME	
6. Compare the concepts of an Ideal Parallel Resonant Circuit to a Practical Parallel Resonant Circuit.		SAME	SAME	SAME	
7. Analyze Parallel Resonant Circuits.		SAME	SAME	SAME	
8. Compare Parallel Resonant Circuits with Series Resonant Circuits.		SAME	SAME	SAME	
9. Analyze the effects of dampening a parallel resonant circuit including how it affects the Q and bandwidth of the circuit.		SAME	SAME	SAME	

*(Use a logical process to find the fault(s) in a product/device/circuit, replace and/or repair the defect and demonstrate corrected operation.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:

Competency: *Troubleshoot and repair AC frequency selective filter circuits. (C.27)(PAGE 2 OF 2)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks: 10. Analyze the frequency response curves of a resonant circuit.			ACT Level 5 SCANS F3 & F4	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	**Resources**: Time: Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/corrects performance; improves;** Technology: Selects/ Applies/maintains
11. Analyze the Bandwidth of a resonant circuit.			SAME	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: SAME	
12. Analyze the Bandpass of a resonant circuit.			SAME	SAME	SAME	
13. Analyze the relative amplitudes of the voltages, currents and impedances used to establish the limits of the curves.			SAME	SAME	SAME	
14. Evaluate Tuning, Bandspreading and the advantages of Multiple Tuned Stages.			SAME	SAME	SAME	
15. Construct circuit for both series/parallel resonant circuit.			SAME	SAME	SAME	
16. Measure current, voltages to establish frequency response curves.			SAME	SAME	SAME	

*(Use a logical process to find the fault(s) in a product/device/circuit, replace and/or repair the defect and demonstrate corrected operation.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:

Competency: *Fabricate and demonstrate AC polyphase circuits. (C.29)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks: 1. Check for the presence of proper voltages 2. Replace fuses/circuit breakers or other devices		DMM/WITH CLAMP ON PROBE	ACT Level 4 SCANS F1-b SAME	ACT Level 4 SCANS F3 & F4 SAME	ACT Level 4 SCANS: Thinking Skills: All Personal Qualities: All SAME	Resources: Time: Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/ Facility:** Acquires, stores, uses materials efficiently; Interpersonal: Team: Participates as team; **teaches others; Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; Information: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information Systems: **understands systems; monitors/ corrects performance; improves;** Technology: **Selects/ Applies/maintains**

*(Build the product/device/circuit and show that it performs as expected.)

Occupation: Electronic Technician
Duty Area/Function:

Task Analysis Worksheet

Competency: *Troubleshoot and repair AC polyphase circuits. (C.30)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks: 1. Check for the presence of proper voltages		DMM/WITH CLAMP-ON PROBE	ACT Level 4 SCANS F1-b	ACT Level 4 SCANS F3 & F4	ACT Level 4 SCANS: Thinking Skills: All Personal Qualities: All	**Resources: Time:** Selects goal relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/corrects performance; improves; Technology: Selects/ Applies/maintains**
2. Replace fuses/circuit breakers or other devices			SAME	SAME	SAME	

*(Use a logical process to find the fault(s) in a product/device/circuit, replace and/or repair the defect and demonstrate corrected operation.)

Occupation: Electronic Technician
Duty Area/Function:

Task Analysis Worksheet

Competency: *Fabricate and demonstrate AC phase locked loop circuits. (C.32)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks: 1. Components: a. Crystal controlled Ref oscillator b. Voltage controlled oscillator c. Phase detector d. Low pass filter e. D.C. amplifier			ACT Level 5 SCANS: F3 & F4	ACT Level 6 SCANS: F3 & F4	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	Resources: Time: Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; Interpersonal: **Team:** Participates as team; **teaches others; Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly [illegible]; **Works** [illegible]**sity:** works [illegible]rs; Information: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information Systems: understands systems; monitors/corrects performance; improves; Technology: Selects/ Applies/maintains
2. Comparison of AC phase relationships to produce error voltage			SAME	SAME	SAME	
3. Filtering and application of error voltage to VCo for FRPO correction			SAME	SAME	SAME	
(Note: most PLL circuits except for Crystals and frequency dividers are incorporated into integrated circuits.)						

*(Build the product/device/circuit and show that it performs as expected.)

Occupation: Electronic Technician
Duty Area/Function:

Task Analysis Worksheet

Competency: *Troubleshoot and repair AC phase locked loop circuits. (C.33)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks: 1. Components: a. Crystal controlled Ref oscillator b. Voltage controlled oscillator c. Phase detector d. Low pass filter e. D.C. amplifier			ACT Level 5 SCANS: F3 & F4	ACT Level 6 SCANS: F3 & F4	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	**Resources: Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal: Team:** Participates as team; **teaches others; Leadership:**communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information:** Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/corrects performance; improves; Technology:** Selects/ **Applies/maintains**
2. Comparison of AC phase relationships to produce error voltage			SAME	SAME	SAME	
3. Filtering and application of error voltage to VCo for FRPO correction			SAME	SAME	SAME	
4. Change PLL IC or crystal or divider IC						

*(Use a logical process to find the fault(s) in a product/device/circuit, replace and/or repair the defect and demonstrate corrected operation.)

DISCRETE SOLID STATE DEVICES

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:

Competency: *Fabricate and demonstrate diode circuits. (D.07)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks: 1. Construct simple diode circuit		EIF 02,08,014,015,022	ACT Level 5 SCANS: F1-b	ACT Level 5 SCANS: F3 & F4	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	**Resources: Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership:**communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information:** Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/corrects performance; improves; Technology:** Selects/ Applies/maintains
2. Analyze simple diode circuit			SAME	SAME	SAME	
3. Take circuit voltage and current measurements			SAME	SAME	SAME	
4. Plot a diode's I-E characteristic curve			SAME	SAME	SAME	
5. Recognize & construct clipper			SAME	SAME	SAME	
6. Recognize & construct clamper			SAME	SAME	SAME	
7. Recognize & construct multiplier circuits			SAME	SAME	SAME	

*(Build the product/device/circuit and show that it performs as expected.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:

Competency: *Troubleshoot and repair diode circuits. (D.08)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks: 1. Determine whether or not a device (diode) is defective using an OHM METER		EIF 02, 08, 014, 015, 022	ACT Level 5 SCANS: F1-b	ACT Level 5 SCANS: F3 & F4	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	Resources: Time: Selects goal relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others;** **Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems**: **understands systems; monitors/corrects performance; improves;** **Technology**: **Selects/ Applies, maintains**
2. Construct, analyze and troubleshoot basic rectified circuits and basic power supply circuits.			SAME	SAME	SAME	

*(Use a logical process to find the fault(s) in a product/device/circuit, replace and/or repair the defect and demonstrate corrected operation.)

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Occupation: Electronic Technician
Duty Area/Function:

Task Analysis Worksheet

Competency: *Fabricate and demonstrate optoelectronic circuits (gate isolators, interrupt sensors, infra red sensors, etc.) (D.10)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks:						
1. Check parameters and ratings of photodiode			ACT Level 5 SCANS: F1-b	ACT Level 5 SCANS: F3 & F4	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	**Resources**: Time: Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** Team: Participates as team; **teaches others; Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity**: works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/corrects performance; improves; Technology: Selects/ Applies/maintains**
2. Check the operation of a standard phototransister and compare it to the photo-darlington transistor.			SAME	SAME	SAME	
3. Check operation of the photodetector & the LASCR			SAME	SAME	SAME	
4. Construct optoisolators & optointerrupters and check for operation and applications			SAME	SAME	SAME	
5. Calculate the wavelength of signal			SAME	SAME	SAME	

*(Build the product/device/circuit and show that it performs as expected.)

Occupation: Electronic Technician
Duty Area/Function:

Task Analysis Worksheet

Competency: *Troubleshoot and repair optoelectronic circuits (Gate isolators, Interrupt sensors, infra red sensors, etc.) (D.11)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks: 1. Check parameters and ratings of photodiode			ACT Level 5 SCANS: F1-b	ACT Level 5 SCANS: F3 & F4	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	**Resources**: Time: Selects goal relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/corrects performance; improves;** **Technology**: Selects/ Applies/maintains
2. Check the operation of a standard phototransister and compare it to the photo darlington transistor.			SAME	SAME	SAME	
3. Check operation of the photodetector & the LASCR			SAME	SAME	SAME	
4. Construct optoisolators & optointerrupters and check for operation and applications			SAME	SAME	SAME	
5. Calculate the wavelength of signal			SAME	SAME	SAME	

*(Use a logical process to find the fault(s) in a product/device/circuit, replace and/or repair the defect and demonstrate corrected operation.)

Occupation: Electronic Technician
Duty Area/Function:

Task Analysis Worksheet

Competency: *Fabricate and demonstrate single stage amplifiers. (D.13)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks:						
1. Construct a BJT base bias circuit, an emmitter bias & voltage divider bias CIR Circuit & demonstrate the Q-point starlity for each		EIF 02, 08, 014, 015, 022	ACT Level 5 SCANS: F1-b	ACT Level 5 SCANS: F3 & F4	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	**Resources**: Time: Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others;** **Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/corrects performance; improves;** **Technology:** Selects/ **Applies/maintains**
2. Perform low- & high- frequency analysis of a BJT amplifer			SAME	SAME	SAME	
3. Perform gain calculations using decibels			SAME	SAME	SAME	
4. Construct a class c amplifier; calculate & measure the values of VB, VC, and VE			SAME	SAME	SAME	
5. Construct a simple JFET circuit, observe drain current while varying the gate-source voltage & use the data to plot a GM curve			SAME	SAME	SAME	
6. Construct a common source amplifier and perform circuit measurements and calculations.			SAME	SAME	SAME	

*(Build the product/device/circuit and show that it performs as expected.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:

Competency: *Troubleshoot and repair single stage amplifiers. (D.14)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks: 1. Construct a BJT base-bias circuit, an emmitter-bias & voltage-divider bias CIR Circuit & demonstrate the Q-point starlity for each 2. Perform low- & high- frequency analysis of a BJT amplifer 3. Perform gain calculations using decibels 4. Construct a class c amplifier; calculate & measure the values of VB, VC, and VE 5. Construct a simple JFET circuit, observe drain current while varying the gate-source voltage & use the data to plot a GM curve 6. Construct a common-source amplifier and perform circuit measurements and calculations.		EIF 02, 08, 014, 015, 022	ACT Level 5 SCANS: F1-b SAME SAME SAME SAME SAME	ACT Level 5 SCANS: F3 & F4 SAME SAME SAME SAME SAME	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All SAME SAME SAME SAME SAME	**Resources**: Time: Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/corrects performance; improves; Technology:** Selects/ Applies/maintains

*(Use a logical process to find the fault(s) in a product/device/circuit, replace and/or repair the defect and demonstrate corrected operation.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:

Competency: *Fabricate and demonstrate thyristor circuitry (SCR, TRIAC, DIAC, etc.) (D.16)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks: 1. Build and analyze a simple SCR Phase controller circuit 2. Discuss the construction, operation and common applications for the DIAC & TRIAC		EIF 02, 08, 014, 015, 022	ACT Level 5 SCANS F1-b SAME	ACT Level 5 SCANS F3 & F4 SAME	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All SAME	**Resources: Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/corrects performance; improves; Technology:** Selects/ Applies/maintains

*(Build the product/device/circuit and show that it performs as expected.)

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Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:

Competency: *Troubleshoot and repair thyristor circuitry (SCR, TRIAC, DIAC, etc.) (D.17)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks: 1. Test a low power SCR with an OHM meter & discuss SCR circuit troubleshooting 2. Build and analyze a simple DIAC & TRIAC control circuit.		EIF 02, 08, 014, 015, 022	ACT Level 5 SCANS Level F1-b	ACT Level 5 SCANS Level F3 & F4	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All SAME	**Resources: Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership:**communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/corrects performance; improves; Technology:** Selects/ Applies/maintains

*(Use a logical process to find the fault(s) in a product/device/circuit, replace and/or repair the defect and demonstrate corrected operation.)

ANALOG CIRCUITS

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Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:
Competency: *Fabricate and demonstrate multistage amplifiers. (E.02)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/skills required)
Performance Skills						
Tasks: 1. Analyze the frequency spectrum and where the audio range fits into the spectrum.		Function Gen., Omm, Scope, Proto Board, components, hook-up wire	ACT Level 4 SCANS F1-b SAME	ACT Level 6 SCANS F3 & F4 SAME	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All SAME	**Resources:** **Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/ Facility:** Acquires, stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others;** **Leadership:**communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information:** Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems;monitors/ corrects performance; improves;** **Technology: Selects/ Applies/maintains**
2. Distinguish between voltage and power amplifiers and the various types of devices used in these circuits.						
3. Differentiate between the different classes of amplifiers (A, AB, R) and the biasing arrangements for each.			SAME	SAME	SAME	
4. Explain the functions of the transducers (microphones, earphones, loudspeakers) used in audio amplifiers.			SAME	SAME	SAME	
5. Identify the methods of coupling and impedance matching employed in audio amplifiers.			SAME	SAME	SAME	
6. Recognize single-ended, push-pull and complementary symmetry audio amplifier circuits and their characteristics.			SAME	SAME	SAME	
7. Analyze the use of inverse feedback for linearity control and the different methods employed in volume and tone control.			SAME	SAME	SAME	
8. Measure the effects of some typical transistor, operational amplifier and active bandpass filter circuits.			SAME	SAME	SAME	
9. Perform laboratory experiments and problem solving exercises in support of above tasks.			SAME	SAME	SAME	

*(Build the product/device/circuit and show that it performs as expected.)

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Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:
Competency: *Troubleshoot and repair multistage amplifiers. (E.03)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks: 1. Analyze the frequency spectrum and where the audio range fits into the spectrum.		Function Gen., Omm, Scope, Proto Board, components, hook-up wire	ACT Level 4 SCANS F1-b	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	**Resources:** Time: Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership:**communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information:** Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/corrects performance; improves; Technology: Selects/ Applies/maintains**
2. Distinguish between voltage and power amplifiers and the various types of devices used in these circuits.			SAME	SAME	SAME	
3. Differentiate between the different classes of amplifiers (A, AB, R) and the biasing arrangements for each.			SAME	SAME	SAME	
4. Explain the functions of the transducers (microphones, earphones, loudspeakers) used in audio amplifiers.			SAME	SAME	SAME	
5. Identify the methods of coupling and impedance matching employed in audio amplifiers.			SAME	SAME	SAME	
6. Recognize single-ended, push-pull and complementary symmetry audio amplifier circuits and their characteristics.			SAME	SAME	SAME	
7. Analyze the use of inverse feedback for linearity control and the different methods employed in volume and tone control.			SAME	SAME	SAME	
8. Measure the effects of some typical transistor, operational amplifier and active bandpass filter circuits.			SAME			
9. Perform laboratory experiments and problem solving exercises in support of above tasks.			SAME			

*(Use a logical process to find the fault(s) in a product/device/circuit, replace and/or repair the defect and demonstrate corrected operation.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:
Competency: *Fabricate and demonstrate RF/IF circuits. (E.05)(Page 1 of 2)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks: 1. Select the proper RF amplifier for a specific application using the frequency voltage and power requirements.			ACT Level 4 SCANS F1-b	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	Resources: **Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores. uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/corrects performance; improves;** **Technology: Selects/ Applies/maintains**
2. Define the requirements, advantages/disadvantages of the different biasing arrangements of RF amplifiers.			SAME	SAME	SAME	
3. List the different methods of coupling between RF stages and the advantages/disadvantages/ limitations of each.			SAME	SAME	SAME	
4. Recognize single-ended/parallel/ push-pull operations and how to tune the output circuits of each configuration.			SAME	SAME	SAME	
5. Analyze the requirements for and the different methods of neturalizing RF amplifiers.			SAME	SAME	SAME	
6. Identify the characteristics of and requirements for frequency multiplier circuits in RF amplifier applications.			SAME	SAME	SAME	
7. Review method for determining values of L and C for resonant circuits.			SAME	SAME	SAME	
8. Explain the advantages of grounded grid (base gate) RF amplifiers and Pi-network outputs.			SAME	SAME	SAME	
9. Analyze the special characteristics of UHF nad VHF amplifiers.			SAME	SAME	SAME	
10. Examine transistor RF amplifiers and Pi-network output networks.			SAME	SAME	SAME	

*(Build the product/device/circuit and show that it performs as expected.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:
Competency: *Fabricate and demonstrate RF/IF circuits. (E.05)(Page 2 of 2)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks:						
11. Practice the techniques of troubleshooting RF amplifier circuits.		SAME	SAME	SAME	SAME	SAME
12. Complete laboratory experiments and exercise problems to facilitate understanding of the above tasks.		SAME	SAME	SAME	SAME	SAME

*(Build the product/device/circuit and show that it performs as expected.)

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Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:
Competency: *Troubleshoot and repair RF/IF circuits. (E.06)(Page 1 of 2)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks: 1. Select the proper RF amplifier for a specific application using the frequency voltage and power requirements.			ACT Level 4 SCANS F1-b	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	**Resources: Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others;** **Leadership:**communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information:** Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/corrects performance; improves;** **Technology: Selects/ Applies/maintains**
2. Define the requirements, advantages/disadvantages of the different biasing arrangements of RF amplifiers.			SAME	SAME	SAME	
3. List the different methods of coupling between RF stages and the advantages/disadvantages/ limitations of each.			SAME	SAME	SAME	
4. Recognize single-ended/parallel/ push-pull operations and how to tune the output circuits of each configuration.			SAME	SAME	SAME	
5. Analyze the requirements for and the different methods of neturalizing RF amplifiers.			SAME	SAME	SAME	
6. Identify the characteristics of and requirements for frequency multiplier circuits in RF amplifier applications.			SAME	SAME	SAME	
7. Review method for determining values of L and C for resonant circuits.			SAME	SAME	SAME	
8. Explain the advantages of grounded grid (base gate) RF amplifiers and Pi-network outputs.			SAME	SAME	SAME	
9. Analyze the special characteristics of UHF nad VHF amplifiers.			SAME	SAME	SAME	
10. Examine transistor RF amplifiers and Pi-network output networks.			SAME	SAME	SAME	

*(Build the product/device/circuit and show that it performs as expected.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:
Competency: *Troubleshoot and repair RF/IF circuits. (E.06) (Page 2 of 2)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks:						
11. Practice the techniques of troubleshooting RF amplifier circuits.		SAME	SAME	SAME	SAME	SAME
12. Complete laboratory experiments and exercise problems to facilitate understanding of the above tasks.		SAME	SAME	SAME	SAME	SAME

*(Build the product/device/circuit and show that it performs as expected.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:
Competency: *Fabricate and demonstrate linear power supplies and filters. (E.08)(Page 1 of 3)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/skills required)
Performance Skills						
Tasks:		AC Source, DMM, Scope, Proto Board, Diodes and other components, hook-up wire			ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	**Resources: Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/corrects performance; improves; Technology: Selects/ Applies/maintains**
1. Explain the purpose of a power supply and list the circuits involved.			ACT Level 4 SCANS F1-d	ACT Level 6 SCANS F3 & F4		
2. Explain the operation of the half-wave rectifier/the full-wave rectifier/bridge rectifier.			SAME	SAME	SAME	
3. Calculate the peak and DC average output voltage and current for any rectifier circuit.			SAME	SAME	SAME	
4. Discuss the effects that filtering has on a rectifier circuit.			SAME	SAME	SAME	
5. Determine the PIV for a diode in any rectifier circuit.			SAME	SAME	SAME	
6. Calculate the current/voltage values for a filtered rectifier circuit.			SAME	SAME	SAME	
7. Explain the operation of a shunt zener regulator and calculate the values of its voltages and currents.			SAME	SAME	SAME	
8. Construct, analyze, and trouble-shoot basic rectifier circuits and basic power supply circuits.			SAME	SAME	SAME	
9. State the basic operation of clippers, clampers, and voltage multipliers and the purposes served by each.			SAME	SAME	SAME	
10. Discuss the use of clippers for transient protection.			SAME	SAME	SAME	
11. Describe the operation of an AM diode detector circuit.			SAME	SAME	SAME	
12. Discuss the use of LEDs as level indicators.			SAME	SAME	SAME	

*(Build the product/device/circuit and show that it performs as expected.)

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Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:
Competency: *Fabricate and demonstrate linear power supplies and filters. (E.08)(Page 2 of 3)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks:						
13. Explain the operation of the 7-segment display, the common-cathode display and the common anode display.		SAME	SAME	SAME	SAME	SAME
14. Recognize the construct clipper, clamper and multiplier circuits		SAME	SAME	SAME	SAME	SAME
15. Draw circuit diagrams and their respective input and output waveforms for half-wave rectifiers, full-wave rectifiers, filtered rectifiers, clippers, and clampers.						
16. Define/calculate the line regulation rating of a given voltage regulator.		SAME	SAME	SAME	SAME	SAME
17. Define/calculate the load regulation rating of a given voltage regulator.		SAME	SAME	SAME	SAME	SAME
18. Define/explain the single regulation rating of a given voltage regulator.		SAME	SAME	SAME	SAME	SAME
19. Compare/contrast the series regulator and the shunt regulator.		SAME	SAME	SAME	SAME	SAME
20. Explain why the series regulator is preferred over the shunt regulator.						
21. Explain the operation of the IC voltage regulator.		SAME	SAME	SAME	SAME	SAME
22. List/define the major parameters and ratings of an IC voltage regulator.		SAME	SAME	SAME	SAME	SAME

*(Build the product/device/circuit and show that it performs as expected.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:
Competency: *Fabricate and demonstrate linear power supplies and filters. (E.08)(Page 3 of 3)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks:						
23. Calculate the maximum allowable input voltage and the value of regulated output voltage for an adjustable IC regulator.		SAME	SAME	SAME	SAME	SAME
24. Construct/evaluate discrete voltage regulator circuits and IC regulator circuits.			SAME	SAME	SAME	SAME

*(Build the product/device/circuit and show that it performs as expected.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:
Competency: *Troubleshoot and repair linear power supplies and filters. (E.09)(Page 1 of 3)

Technology Performance Skills		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/skills required)
Tasks:		AC Source, DMM, Scope, Proto Board, Diodes and other components, hook-up wire			ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	**Resources: Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership:**communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information:** Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/corrects performance; improves; Technology: Selects/ Applies/maintains**
1. Explain the purpose of a power supply and list the circuits involved.			ACT Level 4 SCANS F1-d	ACT Level 6 SCANS F3 & F4		
2. Explain the operation of the half-wave rectifier/the full-wave rectifier/bridge rectifier.			SAME	SAME	SAME	
3. Calculate the peak and DC average output voltage and current for any rectifier circuit.			SAME	SAME	SAME	
4. Discuss the effects that filtering has on a rectifier circuit.			SAME	SAME	SAME	
5. Determine the PIV for a diode in any rectifier circuit.			SAME	SAME	SAME	
6. Calculate the current/voltage values for a filtered rectifier circuit.			SAME	SAME	SAME	
7. Explain the operation of a shunt zener regulator and calculate the values of its voltages and currents.			SAME	SAME	SAME	
8. Construct, analyze, and troubleshoot basic rectifier circuits and basic power supply circuits.			SAME	SAME	SAME	
9. State the basic operation of clippers, clampers, and voltage multipliers and the purposes served by each.			SAME	SAME	SAME	
10. Discuss the use of clippers for transient protection.			SAME	SAME	SAME	
11. Describe the operation of an AM diode detector circuit.			SAME	SAME	SAME	
12. Discuss the use of LEDs as level indicators.			SAME	SAME	SAME	

*(Use a logical process to find the fault(s) in a product/device/circuit, replace and/or repair the defect and demonstrate corrected operation.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:
Competency: *Troubleshoot and repair linear power supplies and filters. (E.09)(Page 2 of 3)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks: 13. Explain the operation of the 7-segment display, the common cathode display and the common anode display.		SAME	SAME	SAME	SAME	SAME
14. Recognize the construct clipper, clamper and multiplier circuits		SAME	SAME	SAME	SAME	SAME
15. Draw circuit diagrams and their respective input and output waveforms for half-wave rectifiers, full-wave rectifiers, filtered rectifiers, clippers, and clampers.						
16. Define/calculate the line regulation rating of a given voltage regulator.		SAME	SAME	SAME	SAME	SAME
17. Define/calculate the load regulation rating of a given voltage regulator.		SAME	SAME	SAME	SAME	SAME
18. Define/explain the single regulation rating of a given voltage regulator.		SAME	SAME	SAME	SAME	SAME
19. Compare/contrast the series regulator and the shunt regulator.		SAME	SAME	SAME	SAME	SAME
20. Explain why the series regulator is preferred over the shunt regulator.						
21. Explain the operation of the IC voltage regulator.		SAME	SAME	SAME	SAME	SAME
22. List/define the major parameters and ratings of an IC voltage regulator.		SAME	SAME	SAME	SAME	SAME

*(Use a logical process to find the fault(s) in a product/device/circuit, replace and/or repair the defect and demonstrate corrected operation.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:
Competency: *Troubleshoot and repair linear power supplies and filters. (E.09)(Page 3 of 3)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks: 23. Calculate the maximum allowable input voltage and the value of regulated output voltage for an adjustable IC regulator.		SAME	SAME	SAME	SAME	SAME
24. Construct/evaluate discrete voltage regulator circuits and IC regulator circuits.			SAME	SAME	SAME	SAME

*(Use a logical process to find the fault(s) in a product/device/circuit, replace and/or repair the defect and demonstrate corrected operation.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:
Competency: *Fabricate and demonstrate operational amplifier circuits. (E.11)(Page 1 of 2)

Technology	Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills					
Tasks: 1. Operational amplifier a. Interpret a typical operational amplifier data sheet. b. Measure common operational amplifier parameters. c. Identify input and feedback elements and calculate the effects of feedback on the circuit.	Function generator, Scope, DMM, Proto Board, assorted op amps & components	ACT Level 4 SCANS F1-d	ACT Level 6 SCANS F4 & F3	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	**Resources:** Time: Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership:**communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information:** Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/corrects performance; improves; Technology:** Selects/ Applies/maintains
2. Basic linear amplifier circuits Construct, predict the performances of, and demonstrate an understanding of the operation of the: 1) voltage follower; 2) non-inverting amplifier; 3) inverting amplifier; 4) 2-input summing amplifier; 5) difference amplifier.		SAME	SAME	SAME	
3. Differentiator and integrator Construct, predict the performances of, and demonstrate an understanding of the operation of the differentiator and integrator.		SAME	SAME	SAME	

*(Build the product/device/circuit and show that it performs as expected.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:
Competency: *Fabricate and demonstrate operational amplifier circuits. (E.11)(Page 2 of 2)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks: 4. Non-linear signal processing circuits Construct, predict the performances of, and demonstrate an understanding of the operation of the: 1) non-inverting comparator; 2) sine-to-square wave converter; 3) window comparator; 4) precision half-wave rectifier; 5) precision full-wave rectifier.		Function generator, Scope, DMM, Proto Board, assorted op-amps & components	ACT Level 4 SCANS F1-d	ACT Level 6 SCANS F4 & F3	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	SAME
5. Generators Construct, predict the performance of, and demonstrate an understanding of the operation of the: 1) wien-bridge sine-wave oscillator; 2) square wave oscillator; 3) combination square and triangle wave generator.			SAME	SAME	SAME	
6. The Norton op-amp a. Predict and demonstrate the effect of varying the bias of the Norton op-amp. b. Construct, predict the performances of, and demonstrate an understanding of the operation of the: 1) non-inverting AC amplifier; 2) inverting AC amplifier; 3) voltage controlled oscillator.			SAME	SAME	SAME	

*(Build the product/device/circuit and show that it performs as expected.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:
Competency: *Troubleshoot and repair operational amplifier circuits. (E.12)(Page 1 of 2)

Technology Performance Skills	Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, infor mation, interpersonal and systems competencies/ skills required)
Tasks: Remove and replace by: 1. Operational amplifier a. Interpret a typical operational amplifier data sheet. b. Measure common operational amplifier parameters. c. Identify input and feedback elements and calculate the effects of feedback on the circuit.	Function generator, Scope, DMM, Proto Board, assorted op amps & components	ACT Level 4 SCANS F1-d	ACT Level 6 SCANS F4 & F3	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	**Resources: Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership:**communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information:** Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/corrects performance; improves;** **Technology: Selects/ Applies/maintains**
2. Basic linear amplifier circuits Construct, predict the performances of, and demonstrate an understanding of the operation of the: 1) voltage follower; 2) non-inverting amplifier; 3) inverting amplifier; 4) 2-input summing amplifier; 5) difference amplifier.		SAME	SAME	SAME	
3. Differentiator and integrator Construct, predict the performances of, and demonstrate an understanding of the operation of the differentiator and integrator.		SAME	SAME	SAME	

*(Use a logical process to find the fault(s) in a product/device/circuit, replace and/or repair the defect and demonstrate corrected operation.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:
Competency: *Troubleshoot and repair operational amplifier circuits. (E.12)(Page 2 of 2)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks: 4. Non linear signal processing circuits Construct, predict the performances of, and demonstrate an understanding of the operation of the: 1) non-inverting comparator; 2) sine-to-square wave converter; 3) window comparator; 4) precision half-wave rectifier; 5) precision full-wave rectifier.		Function generator, Scope, DMM, Proto Board, assorted op-amps & components	ACT Level 4 SCANS F1-d	ACT Level 6 SCANS F4 & F3	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	SAME
5. Generators Construct, predict the performance of, and demonstrate an understanding of the operation of the: 1) wien-bridge sine-wave oscillator; 2) square wave oscillator; 3) combination square and triangle wave generator.			SAME	SAME	SAME	
6. The Norton op-amp a. Predict and demonstrate the effect of varying the bias of the Norton op-amp. b. Construct, predict the performances of, and demonstrate an understanding of the operation of the: 1) non-inverting AC amplifier; 2) inverting AC amplifier; 3) voltage controlled oscillator.			SAME	SAME	SAME	

*(Use a logical process to find the fault(s) in a product/device/circuit, replace and/or repair the defect and demonstrate corrected operation.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:
Competency: *Fabricate and demonstrate audio power amplifiers. (E.14)

Technology	Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills					
Tasks: 1. Measure the effects of some typical transistor, operational amplifier and active bandpass filter circuits. 2. Discover the techniques of servicing both transistor and vacuum tube audio amplifiers.	a. Function generator b. DVM c. Scope d. Prob Board e. Voltage AMP trans. f. Power AMP trans. g. Asst. of AMB	ACT Level 4 SCANS F1-b	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: Thinking Skills:All Personal Qualities: All	**Resources: Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/ Facility:** Acquires, stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership:**communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems;monitors/ corrects performance; improves;** **Technology: Selects/ Applies/maintains**

*(Build the product/device/circuit and show that it performs as expected.)

Occupation: Electronic Technician
Duty Area/Function:

Task Analysis Worksheet

Competency: ***Troubleshoot and repair audio power amplifiers.** (E.15)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks: 1. Measure the effects of some typical transistor, operational amplifier and active bandpass filter circuits. 2. Discover the techniques of servicing both transistor and vacuum tube audio amplifiers.		a. Function generator b. DVM c. Scope d. Prob Board e. Voltage AMP trans. f. Power AMP trans. g. Asst. of AMB	ACT Level 4 SCANS F1-b	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: Thinking Skills:All Personal Qualities: All	**Resources**: **Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/ Facility:** Acquires, stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems;monitors/ corrects performance; improves;** **Technology: Selects/ Applies/maintains**

*(Use a logical process to find the fault(s) in a product/device/circuit, replace and/or repair the defect and demonstrate corrected operation.)

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Occupation: Electronic Technician

Task Analysis Worksheet

Duty Area/Function:

Competency: *Fabricate and demonstrate regulated and switching power supply circuits. (E.17)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks: 1. Describe the physical construction/schematic symbols/supply voltage polarities of the n-channel junction FET and the p-channel junction FET.			ACT Level 4 SCANS F1-d	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	**Resources:** Time: Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/ Facility:** Acquires, stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; teaches others; **Leadership:** communicates ideas to justify position, persuades/ convinces; responsibly challenges; **Works with Diversity:** works with others; **Information:** Acquires, evaluates, organizes, maintains, interprets, communicates information; uses computer to process information **Systems:** understands systems; monitors/ corrects performance; improves; **Technology:** Selects/ Applies/maintains
2. Explain the relationship between gate-source voltage, channel width, drain current, and drain-source voltage.			SAME	SAME	SAME	
3. Interpret a set of drain curves and identify the ohmic region/pinch-off/constant-current region.			SAME	SAME	SAME	
4. List the most important parameters of JFETs and state their significance.			SAME	SAME	SAME	
5. Define transconductance and plot a transconductance curve for a given JFET.			SAME	SAME	SAME	
6. Compare/contrast gate-bias, self bias and voltage-divider bias.			SAME	SAME	SAME	
7. Explain the common-source amplifier response to an AC input voltage.			SAME	SAME	SAME	
8. List the gain and impedance features of the common-drain amplifier.			SAME	SAME	SAME	

*(Build the product/device/circuit and show that it performs as expected.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:
Competency: *Troubleshoot and repair regulated and switching power supply circuits. (E.18)

Technology	Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills					
Tasks: 1. Describe the physical construction/schematic symbols/supply voltage polarities of the n-channel junction FET and the p-channel junction FET.		ACT Level 4 SCANS F1-d	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	**Resources:** Time: Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/ Facility:** Acquires, stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership:** communicates ideas to justify position, persuades/ convinces; responsibly challenges; **Works with Diversity:** works with others; **Information:** Acquires, evaluates, organizes, maintains, interprets, communicates information; uses computer to process information **Systems:** understands systems; monitors/ corrects performance; improves; **Technology:** Selects/ Applies/maintains
2. Explain the relationship between gate-source voltage, channel width, drain current, and drain-source voltage.		SAME	SAME	SAME	
3. Interpret a set of drain curves and identify the ohmic region/pinch-off/constant-current region.		SAME	SAME	SAME	
4. List the most important parameters of JFETs and state their significance.		SAME	SAME	SAME	
5. Define transconductance and plot a transconductance curve for a given JFET.		SAME	SAME	SAME	
6. Compare/contrast gate-bias, self bias and voltage divider bias.		SAME	SAME	SAME	
7. Explain the common-source amplifier response to an AC input voltage.		SAME	SAME	SAME	
8. List the gain and impedance features of the common drain amplifier.		SAME	SAME	SAME	

*(Use a logical process to find the fault(s) in a product/device/circuit, replace and/or repair the defect and demonstrate corrected operation.)

Occupation: Electronic Technician
Duty Area/Function:

Task Analysis Worksheet

Competency: *Fabricate and demonstrate active filter circuits. (E.20)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks: 1. Review Conventional filters made from passive devices: a. Low pass (1) RC (2) RL b. Hi pass (1) RC (2) RL c. Band Pass RLC d. Band Block or Stop RLC e. M-Derived f. Constant K g. Low pass active filter using OP-AMP & RC network (1) single pole (first order) (2) DB/decade roll-off h. Hi pass active filter using OP-AMP & RC networks (1) Single Pole (2) DB/decade roll-off i. Band Pass using combination hi-pass/low pass			ACT Level 4 SCANS F1-b	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	**Resources: Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/ Facility:** Acquires, stores, uses materials efficiently; **Interpersonal: Team:** Participates as team; **teaches others; Leadership:**communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information:** Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems;monitors/ corrects performance; improves;Technology: Selects/Applies/maintains**

*(Build the product/device/circuit and show that it performs as expected.)

Occupation: Electronic Technician
Duty Area/Function:

Task Analysis Worksheet

Competency: ***Troubleshoot and repair active filter circuits.** (E.21)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks: 1. Review - Conventional filters made from passive devices: a. Low pass (1) RC (2) RL b. Hi pass (1) RC (2) RL c. Band Pass - RLC d. Band Block or Stop - RLC e. M Derived f. Constant K g. Low pass active filter using OP-AMP & RC network (1) single pole (first order) (2) DB/decade roll-off h. Hi pass active filter using OP-AMP & RC networks (1) Single Pole (2) DB/decade roll-off i. Band Pass using combination hi-pass/low pass j. OP AMPS - PLUG IN (not repairable) k. Passive Components - Troubleshoot in normal manner - using DMM			ACT Level 4 SCANS F1-b	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	**Resources: Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/ Facility:** Acquires, stores, uses materials efficiently; **Interpersonal: Team:** Participates as team; **teaches others; Leadership:** communicates ideas to justify position, persuades/ convinces; responsibly challenges; **Works with Diversity:** works with others; **Information:** Acquires, evaluates, organizes, maintains, interprets, communicates information; uses computer to process information **Systems: understands systems; monitors/ corrects performance; improves; Technology: Selects/Applies/maintains**

*(Use a logical process to find the fault(s) in a product/device/circuit, replace and/or repair the defect and demonstrate corrected operation.)

Occupation: Electronic Technician

Task Analysis Worksheet

Duty Area/Function:

Competency: *Fabricate and demonstrate sinusoidal and non-sinusoidal oscillator circuits. (E.23)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks: 1. List/explain the requirements for proper operation of an oscillator.			ACT Level 4 SCANS F1-d	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	**Resources:** **Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/ Facility:** Acquires, stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others;** **Leadership:**communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information:** Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/ corrects performance; improves;** **Technology:** **Selects/ Applies/maintains**
2. Describe the construction and operation of the phase shift oscillator.			SAME	SAME	SAME	
3. Explain how a multistage discrete amplifier can go into oscillation and how to prevent it.			SAME	SAME	SAME	
4. Describe the construction and operation of a Colpitts oscillator.			SAME	SAME	SAME	
5. Describe the construction and operation of a Clapp oscillator.			SAME	SAME	SAME	
6. Describe the construction and operation of a Hartley oscillator.			SAME	SAME	SAME	
7. Describe the construction and operation of a Armstrong oscillator.			SAME	SAME	SAME	
8. Compare the crystal-controlled oscillator with other types of LC oscillators.			SAME	SAME	SAME	
9. Determine if a given oscillator circuit fulfills the Barkhausen criterion by performing circuit calculations.			SAME	SAME	SAME	
10. Construct/troubleshoot a Colpitts oscillator and a Clapp oscillator.			SAME	SAME	SAME	

*(Build the product/device/circuit and show that it performs as expected.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:
Competency: *Troubleshoot and repair sinusoidal and non-sinusoidal oscillator circuits. (E.24)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks: 1. List/explain the requirements for proper operation of an oscillator.			ACT Level 4 SCANS F1-d	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	**Resources: Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/ Facility:** Acquires, stores, uses materials efficiently; **Interpersonal: Team:** Participates as team; **teaches others; Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/ corrects performance; improves; Technology: Selects/ Applies/maintains**
2. Describe the construction and operation of the phase shift oscillator.			SAME	SAME	SAME	
3. Explain how a multistage discrete amplifier can go into oscillation and how to prevent it.			SAME	SAME	SAME	
4. Describe the construction and operation of a Colpitts oscillator.			SAME	SAME	SAME	
5. Describe the construction and operation of a Clapp oscillator.			SAME	SAME	SAME	
6. Describe the construction and operation of a Hartley oscillator.			SAME	SAME	SAME	
7. Describe the construction and operation of a Armstrong oscillator.			SAME	SAME	SAME	
8. Compare the crystal-controlled oscillator with other types of LC oscillators.			SAME	SAME	SAME	
9. Determine if a given oscillator circuit fulfills the Barkhausen criterion by performing circuit calculations.			SAME	SAME	SAME	
10.Construct/troubleshoot a Colpitts oscillator and a Clapp oscillator.			SAME	SAME	SAME	

*(Use a logical process to find the fault(s) in a product/device/circuit, replace and/or repair the defect and demonstrate corrected operation.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:
Competency: *Fabricate and demonstrate fiber optic circuits using photodiodes or LASERS. (E.26)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks: 1. Demonstrate a fundamental understanding of fiber optics.		Scope, TDR, splicer, glass fibers, TXMIT & Rec. system	ACT Level 4 SCANS F1-d	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	**Resources: Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/ Facility:** Acquires, stores, uses materials efficiently; **Interpersonal: Team:** Participates as team; **teaches others; Leadership:**communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information:** Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/ corrects performance; improves; Technology: Selects/ Applies/maintains**
2. Demonstrate an understanding of the application of fiber optics in electronics.			SAME	SAME	SAME	
3. Explain refractive index and higher order modes.			SAME	SAME	SAME	
4. Explain the characteristics of the fiber optics and signal attenuation.			SAME	SAME	SAME	
5. Explain the physics of light generation.			SAME	SAME	SAME	
6. Explain the characteristics of the laser diode and light emitting diode.			SAME	SAME	SAME	
7. Explain the principle of opto electronic transducers.			SAME	SAME	SAME	
8. Explain the function of the essential components of any fiber optic system.			SAME	SAME	SAME	
9. Perform experiments in fiber optic system.			SAME	SAME	SAME	
10.Explain the characteristics of couplers and connectors.			SAME	SAME	SAME	
11.Perform experiments using fiber optic couplers and connectors.			SAME	SAME	SAME	

*(Build the product/device/circuit and show that it performs as expected.)

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Occupation: Electronic Technician

Duty Area/Function:

Competency: *Troubleshoot and repair fiber optic circuits using photodiodes or LASERS. (E.27)

Task Analysis Worksheet

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks: 1. Demonstrate a fundamental understanding of fiber optics. 2. Demonstrate an understanding of the application of fiber optics in electronics. 3. Explain refractive index and higher order modes. 4. Explain the characteristics of the fiber optics and signal attenuation. 5. Explain the physics of light generation. 6. Explain the characteristics of the laser diode and light emitting diode. 7. Explain the principle of opto electronic transducers. 8. Explain the function of the essential components of any fiber optic system. 9. Perform experiments in fiber optic system. 10.Explain the characteristics of couplers and connectors. 11.Perform experiments using fiber optic couplers and connectors.		Scope, TDR, splicer, glass fibers, TXMIT & Rec. system	ACT Level 4 SCANS F1-d SAME SAME SAME SAME SAME SAME SAME SAME SAME SAME SAME	ACT Level 6 SCANS F3 & F4 SAME SAME SAME SAME SAME SAME SAME SAME SAME SAME SAME	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All SAME SAME SAME SAME SAME SAME SAME SAME SAME SAME SAME	**Resources: Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/ Facility:** Acquires, stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership:**communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information:** Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/ corrects performance; improves; Technology: Selects/ Applies/maintains**

*(Use a logical process to find the fault(s) in a product/device/circuit, replace and/or repair the defect and demonstrate corrected operation.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:
Competency: *Fabricate and demonstrate signal modulation systems (AM, FM, stereo). (E.29)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks:						

*(Build the product/device/circuit and show that it performs as expected.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:

Competency: *Troubleshoot and repair signal modulation systems (AM, FM, stereo) (E.30)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks:						

*(Use a logical process to find the fault(s) in a product/device/circuit, replace and/or repair the defect and demonstrate corrected operation.)

DIGITAL CIRCUITS

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Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:
Competency: *Fabricate and demonstrate linear integrated circuits. (F.04)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks: 1. Construct & analyze A/D converters & circuits. 2. Construct & analyze D/A converter circuits.			ACT Level 5 SCANS Level F1-b SAME	ACT Level 4 SCANS F3-a SAME	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All SAME	**Resources: Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/ Facility:** Acquires, stores, uses materials efficiently; **Interpersonal: Team:** Participates as team; **teaches others; Leadership:** communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information:** Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/ corrects performance; improves; Technology: Selects/ Applies/maintains**

*(Build the product/device/circuit and show that it performs as expected.)

Occupation: Electronic Technician
Duty Area/Function:

Task Analysis Worksheet

Competency: *Troubleshoot and repair linear integrated circuits. (F.05)

Technology	Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills					
Tasks: 1. Construct, analyze and troubleshoot A/D converters & circuits. 2. Construct, analyze and troubleshoot D/A converters & circuits.		ACT Level 5 SCANS Level F1-b SAME	ACT Level 4 SCANS F3-a SAME	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All SAME	**Resources: Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/ Facility:** Acquires, stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/ corrects performance; improves; Technology: Selects/ Applies/maintains**

*(Use a logical process to find the fault(s) in a product/device/circuit, replace and/or repair the defect and demonstrate corrected operation.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:
Competency: *Fabricate and demonstrate types of logic gates. (F. 07)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks: 1. Construct & analyze simple logic circuits for the following: AND, OR, NAND, NOR, NOT, inverter. (Use appropriate truth tables for each logic gate)			ACT Level 5 SCANS F1-a	ACT Level 4 SCANS F3	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	**Resources: Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/ Facility:** Acquires, stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership:** communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information:** Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/ corrects performance; improves; Technology: Selects/ Applies/maintains**

*(Build the product/device/circuit and show that it performs as expected.)

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Occupation: Electronic Technician

Task Analysis Worksheet

Duty Area/Function:

Competency: *Troubleshoot and repair types of logic gates. (F.08)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks: 1. Construct, analyze and troubleshoot simple logic circuits for the following: AND, OR, NAND, NOR, NOT, inverter.			ACT Level 5 SCANS F1-a	ACT Level 4 SCANS F3	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	**Resources: Time**: Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/ Facility:** Acquires, stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/ corrects performance; improves; Technology: Selects/ Applies/maintains**

*(Use a logical process to find the fault(s) in a product/device/circuit, replace and/or repair the defect and demonstrate corrected operation.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:
Competency: *Fabricate and demonstrate combinational logic circuits. (F.10)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks: 1. Construct & analyze basic combinational logic circuits.			ACT Level 5 SCANS F1-a	ACT Level 4 SCANS F3	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	**Resources: Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/ Facility:** Acquires, stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership:**communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information:** Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/ corrects performance; improves;** **Technology: Selects/ Applies/maintains**

*(Build the product/device/circuit and show that it performs as expected.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:
Competency: *Troubleshoot and repair combinational logic circuits. (F.11)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks: 1. Construct, analyze and troubleshoot basic combinational logic circuits from a given schematic.			ACT Level 5 SCANS F1 a	ACT Level 4 SCANS F3	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	Resources: Time: Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/ Facility:** Acquires, stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems**: **understands systems; monitors/ corrects performance; improves;** **Technology**: **Selects/ Applies/maintains**

*(Use a logical process to find the fault(s) in a product/device/circuit, replace and/or repair the defect and demonstrate corrected operation.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:
Competency: *Fabricate and demonstrate types of flip-flop circuits. (F.13)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks: 1. Construct flip flop circuits & verify truth tables for different types of flip flops: D, JK, RS.			ACT Level 5 SCANS F1-a	ACT Level 4 SCANS F3	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	**Resources**: Time: Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/ Facility:** Acquires, stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/ corrects performance; improves;** **Technology: Selects/ Applies/maintains**

*(Build the product/device/circuit and show that it performs as expected.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:
Competency: *Troubleshoot and repair flip flop circuits. (F.14)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks: 1. Construct, analyze & troubleshoot flip flop circuits: D, JK, RS.			ACT Level 5 SCANS F1-a	ACT Level 4 SCANS F3	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	Resources: Time: Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/ Facility:** Acquires, stores, uses materials efficiently; Interpersonal: **Team:** Participates as team; **teaches others; Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; [illegible]mation: Acquires, [illegible]uates, organizes, [illegible]ntains, interprets, communicates information;uses computer to process information Systems: **understands systems; monitors/ corrects performance; improves;** Technology: **Selects/ Applies/maintains**

*(Use a logical process to find the fault(s) in a product/device/circuit, replace and/or repair the defect and demonstrate corrected operation.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:
Competency: *Fabricate and demonstrate types of registers and counters. (F.16)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks:					ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	**Resources: Time**: Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/ Facility:** Acquires, stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/ corrects performance; improves; Technology: Selects/ Applies/maintains**
1. Construct & analyze truth tables for registers.			ACT Level 5 SCANS F1-a	ACT Level 4 SCANS F3		
2. Construct & analyze truth tables for counters.			SAME	SAME	SAME	
3. Construct & analyze registers: serial in/parallel out, serial in/serial out, and bidirectional.			SAME	SAME	SAME	
4. Construct and analyze counters as frequency dividers.			SAME	SAME	SAME	

*(Build the product/device/circuit and show that it performs as expected.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:
Competency: *Troubleshoot and repair types of registers and counters. (F.17)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks: 1. Construct, analyze and trouble shoot register circuits.			ACT Level 5 SCANS F1-a	ACT Level 4 SCANS F3	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	**Resources: Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/ Facility:** Acquires, stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership:** communicates ideas to justify position, persuades/ convinces; responsibly challenges; **Works with Diversity:** works with others; **Information:** Acquires, evaluates, organizes, maintains, interprets, communicates information; uses computer to process information **Systems: understands systems; monitors/ corrects performance; improves; Technology: Selects/ Applies/maintains**
2. Construct, analyze and trouble shoot counter circuits.			SAME	SAME	SAME	
			SAME	SAME	SAME	
			SAME	SAME	SAME	

*(Use a logical process to find the fault(s) in a product/device/circuit, replace and/or repair the defect and demonstrate corrected operation.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:
Competency: *Fabricate and demonstrate clock and timing circuits. (F.19)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks:						**Resources: Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/ Facility:** Acquires, stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others;** **Leadership:**communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information:** Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/ corrects performance; improves;** **Technology: Selects/ Applies/maintains**
1. Construct & analyze one shot & multi-vibrator circuits.			ACT Level 5 SCANS F1-a	ACT Level 4 SCANS F3	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	
2. Construct timing for synchronous & asynchronous counter circuits.			SAME	SAME	SAME	
			SAME	SAME	SAME	
			SAME	SAME	SAME	

*(Build the product/device/circuit and show that it performs as expected.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:
Competency: *Troubleshoot and repair clock and timing circuits. (F.20)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks: 1. Construct, analyze & troubleshoot one-shot & multi-vibrator circuits. 2. Construct, analyze, & troubleshoot synchronous & asynchronous counter circuits.			ACT Level 5 SCANS F1-a SAME SAME SAME	ACT Level 4 SCANS F3 SAME SAME SAME	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All SAME SAME SAME	**Resources: Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/ Facility:** Acquires, stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership:** communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information:** Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/ corrects performance; improves; Technology: Selects/ Applies/maintains**

*(Use a logical process to find the fault(s) in a product/device/circuit, replace and/or repair the defect and demonstrate corrected operation.)

Occupation: Electronic Technician

Task Analysis Worksheet

Duty Area/Function: Maintenance/Installation/Repair/Evaluation/Troubleshooter

Competency: *Fabricate and demonstrate types of arithmetic logic circuits (F.22)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks: 1. Build and analyze truth tables and timing diagrams of sum of products circuits. 2. Build and analyze truth tables and timing diagrams of product of sum circuits.		1.Digital Trainer 2.Discrete relevant electronic components. 3.Multimeters 4.Oscilloscopes 5.Logic Probes 6.Logic Analyzer 7.Hand tools 8.Anti-static equipment 9. Data book	ACT Level 5 SCANS F1-a SAME SAME SAME (Listening EIF 063; Speaking EIF 023,027; Writing EIF 062)	ACT Level 4 SCANS F3 SAME SAME SAME (EIF 066,067,069,069 072,073,074,075,076,077,078,082,084,085,086,087,089,090)	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All SAME SAME SAME (EIF 043,044,045, 047,050)	**Resources**: **Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/ Facility:** Acquires, stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership:**communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems**: **understands systems; monitors/ corrects performance; improves;** **Technology**: **Selects/ Applies/maintains**

*(Build the product/device/circuit and show that it performs as expected.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:
Competency: *Troubleshoot and repair types of arithmetic logic circuits. (F.23)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks: 1. Build, analyze and debug sum of products circuits. 2. Build, analyze and debug product of sums circuits.		1.Digital Trainer 2.Discrete relevant electronic components. 3.Multimeters 4.Oscilloscopes 5.Logic Probes 6.Logic Analyzer 7.Hand tools 8.Anti static equipment 9. Data book	ACT Level 5 SCANS F1-a SAME (Listening EIF 063; Speaking EIF 023,027; Writing EIF 062)	ACT Level 4 SCANS F3 SAME (EIF 066,067,069,069 072,073,074,075,076,077,078,082,084,085,086,087,089,090)	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All SAME (EIF 043,044,045, 047,050)	**Resources**: **Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/ Facility:** Acquires, stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems**: **understands systems; monitors/ corrects performance; improves;** **Technology**: **Selects/ Applies/maintains**

*(Use a logical process to find the fault(s) in a product/device/circuit, replace and/or repair the defect and demonstrate corrected operation.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function: Maintenance/Installation/Repair/Evaluation/Troubleshooter
Competency: *Fabricate and demonstrate types of multiplexer and demultiplexer circuits. (F.25)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/skills required)
Performance Skills						
Tasks: 1. Build and analyze truth tables and timing diagrams of multiplexer circuits. 2. Build and analyze truth tables and timing diagrams of demultiplexer circuits.		1.Digital Trainer 2.Discrete relevant electronic components. 3.Multimeters 4.Oscilloscopes 5.Logic Probes 6.Logic Analyzer 7.Hand tools 8.Anti static equipment 9. Data book	ACT Level 5 SCANS F1-d SAME (Listening EIF 063; Speaking EIF 023,027; Writing EIF 062)	ACT Level 5 SCANS F3 & F4 SAME (EIF 066,067,069, 069,072,073,074,075, 076,077,078,082,084,085,086,087,089,090	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All SAME (EIF 043,044,045, 047,050)	**Resources**: **Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/ Facility:** Acquires, stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/ corrects performance; improves;** **Technology: Selects/ Applies/maintains**

*(Build the product/device/circuit and show that it performs as expected.)

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Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:

Competency: *Troubleshoot and repair types of multiplexer and demultiplexer circuits. (F.28)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/skills required)
Performance Skills						
Tasks: 1. Build, analyze and debug multiplexer circuits. 2. Build, analyze and debug demultiplexer circuits.		1.Digital Trainer 2.Discrete relevant electronic components. 3.Multimeters 4.Oscilloscopes 5.Logic Probes 6.Logic Analyzer 7.Hand tools 8.Anti static equipment 9. Data book	ACT Level 5 SCANS F1-b SAME (Listening EIF 063; Speaking EIF 023,027; Writing EIF 062)	ACT Level 5 SCANS F3 & F4 SAME (EIF 066,067,069,069 072,073,074,075,076,077,078,082,084,085,086,087,089,090)	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All SAME (EIF 043,044,045, 047,050)	Resources: Time: Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/ Facility:** Acquires, stores, uses materials efficiently; Interpersonal: **Team:** Participates as team; **teaches others; Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; Information: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information Systems: **understands systems; monitors/ corrects performance; improves;** Technology: **Selects/ Applies/maintains**

*(Use a logical process to find the fault(s) in a product/device/circuit, replace and/or repair the defect and demonstrate corrected operation.)

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Occupation: Electronic Technician
Duty Area/Function:

Task Analysis Worksheet

Competency: *Fabricate and demonstrate types of digital to analog and analog to digital circuits. (F.28)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks:						
1. Analyze gates and their functions			ACT Level 5 SCANS F1-a	ACT Level 4 SCANS F3	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	**Resources: Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/ Facility:** Acquires, stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/ corrects performance; improves; Technology: Selects/ Applies/maintains**
2. Construct truth tables			SAME	SAME	SAME	
3. Apply binary arithmetic			SAME	SAME	SAME	
4. Examine functional circuits			SAME	SAME	SAME	
5. Analyze counters			SAME	SAME	SAME	
6. Analyze multiplexers			SAME	SAME	SAME	
7. Analyze registers			SAME	SAME	SAME	
8. Analyze displays			SAME	SAME	SAME	
9. Analyze convertors (A to D, D to A)			SAME	SAME	SAME	

*(Build the product/device/circuit and show that it performs as expected.)

Occupation: Electronic Technician

Task Analysis Worksheet

Duty Area/Function:

Competency: *Troubleshoot and repair types of digital to analog and analog to digital circuits. (F.29)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks:						
1. Analyze gates and their functions			ACT Level 5 SCANS F1-a	ACT Level 4 SCANS F3	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	**Resources:** **Time:** Selects goal relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/ Facility:** Acquires, stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/ corrects performance; improves;** **Technology: Selects/ Applies/maintains**
2. Construct truth tables			SAME	SAME	SAME	
3. Apply binary arithmetic			SAME	SAME	SAME	
4. Examine functional circuits			SAME	SAME	SAME	
5. Analyze counters			SAME	SAME	SAME	
6. Analyze multiplexers			SAME	SAME	SAME	
7. Analyze registers			SAME	SAME	SAME	
8. Analyze displays			SAME	SAME	SAME	
9. Analyze convertors (A to D, D to A)			SAME	SAME	SAME	
10. Troubleshoot and repair			SAME	SAME	SAME	

*(Use a logical process to find the fault(s) in a product/device/circuit, replace and/or repair the defect and demonstrate corrected operation.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function: Maintenance/Installation/Repair/Evaluation/Troubleshooter

Competency: *Fabricate and demonstrate types of digital display circuits. (F.31)

Technology Performance Skills	Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Tasks: 1. Build and analyze truth tables and timing diagrams of decoder driver circuits.	1.Digital Trainer 2.Discrete relevant electronic components. 3.Multimeters 4.Oscilloscopes 5.Logic Probes 6.Logic Analyzer 7.Hand tools 8.Anti-static equipment 9. Data book	ACT Level 5 SCANS F1-b	ACT Level 4 SCANS F3	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	**Resources: Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/ Facility:** Acquires, stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership:**communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information:** Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/ corrects performance; improves;** **Technology: Selects/ Applies/maintains**
2. Build and analyze truth tables and timing diagrams of counter circuits.		SAME	SAME	SAME	
3. Build and analyze segment display circuits.		SAME (Listening EIF 063; Speaking EIF 023,027; Writing EIF 062)	SAME (EIF 066,067,069,069 072,073,074,075,076,077,078,082,084,085,086,087,089,090)	SAME (EIF 043,044,045, 047,050)	

*(Build the product/device/circuit and show that it performs as expected.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function: Maintenance/Installation/Repair/Evaluation/Troubleshooter

Competency: *Troubleshoot and repair types of digital display circuits. (F.32)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, infor mation, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks: 1. Build, analyze and debug decoder driver circuits. 2. Build, analyze and debug counter circuits. 3. Build, analyze and debug segment display circuits.		1.Digital Trainer 2.Discrete relevant electronic components. 3.Multimeters 4.Oscilloscopes 5.Logic Probes 6.Logic Analyzer 7.Hand tools 8.Anti-static equipment 9. Data book	ACT Level 5 SCANS F1-b SAME SAME (Listening EIF 063; Speaking EIF 023,027; Writing EIF 062)	ACT Level 4 SCANS F3 SAME SAME (EIF 066,067,069,069 072,073,074,075,076,07 7,078,082,084,085,086,0 87,089,090)	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All SAME SAME (EIF 043,044,045, 047,050)	**Resources: Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/ Facility:** Acquires, stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership:**communi cates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information:** Acquires, evaluates, organizes, maintains, interprets, communicates infor mation;uses computer to process information **Systems: understands systems; monitors/ corrects performance; improves;** **Technology: Selects/ Applies/maintains**

*(Use a logical process to find the fault(s) in a product/device/circuit, replace and/or repair the defect and demonstrate corrected operation.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function: Maintenance/Installation/Repair/Evaluation/Troubleshooter/Administration

Competency: *Fabricate and demonstrate digital power distribution and noise problems. (F.34)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks: 1. Build and analyze propagation delay of logic circuits.		1.Digital Trainer 2.Discrete relevant electronic components. 3.Multimeters 4.Oscilloscopes 5.Logic Probes 6.Logic Analyzer 7.Hand tools 8.Anti-static equipment 9. Data book	ACT Level 5 SCANS F1-d	ACT Level 4 SCANS F3 & F4	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	**Resources**: **Time**: Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/ Facility:** Acquires, stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/ corrects performance; improves;** **Technology:** **Selects/ Applies/maintains**
2. Build and analyze power dissipation of logic circuits.			SAME	SAME	SAME	
3. Build and analyze Speed-Power trade off in logic circuits.			SAME	SAME	SAME	
4. Build and analyze noise-immunity as percentage of supply voltage on digital circuits.			SAME	SAME	SAME	
5. Build and analyze fan outs of logic circuits.			SAME (Listening EIF 063; Speaking EIF 023,027; Writing EIF 062)	SAME (EIF 066,067,069,069 072,073,074,075,076,077,078,082,084,085,086,087,088,090)	SAME (EIF 043,044,045, 047,050)	

*(Build the product/device/circuit and show that it performs as expected.)

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Occupation: Electronic Technician

Task Analysis Worksheet

Duty Area/Function: Maintenance/Installation/Repair/Evaluation/Troubleshooter/Administration

Competency: *Troubleshoot and repair digital power distribution and noise problems. (F.35)

Technology Performance Skills		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Tasks: 1. Build, analyze and debug propagation delay problems of logic circuits.		1.Digital Trainer 2.Discrete relevant electronic components. 3.Multimeters 4.Oscilloscopes 5.Logic Probes 6.Logic Analyzer 7.Hand tools 8.Anti-static equipment 9. Data book	ACT Level 5 SCANS F1-d	ACT Level 5 SCANS F3 & F4	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	**Resources**: **Time**: Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/ Facility**: Acquires, stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others;** **Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems****: understands systems; monitors/ corrects performance; improves;** **Technology****: Selects/ Applies/maintains**
2. Build, analyze and debug power dissipation problem of logic circuits.			SAME	SAME	SAME	
3. Build, analyze and debug Speed-Power trade off problems in logic circuits.			SAME	SAME	SAME	
4. Build, analyze and debug noise-immunity problems as percentage of supply voltage in digital circuits.			SAME	SAME	SAME	
5. Build, analyze and debug fan out problems of digital logic circuits.			SAME (Listening EIF 063; Speaking EIF 023,027; Writing EIF 062)	SAME (EIF 066,067,069,069 072,073,074,075,076,077,078,082,084,085,086,087,089,090)	SAME (EIF 043,044,045, 047,050)	

*(Use a logical process to find the fault(s) in a product/device/circuit, replace and/or repair the defect and demonstrate corrected operation.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:

Competency: *Fabricate and demonstrate types of digital encoders and decoders. (F.37)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks: 1. Build and analyze BCD to Decimal decoders circuits.		1.Digital Trainer 2.Discrete relevant electronic components. 3.Multimeters 4.Oscilloscopes 5.Logic Probes 6.Logic Analyzer 7.Hand tools 8.Anti-static equipment 9. Data book	ACT Level 5 SCANS f1-d	ACT Level 5 SCANS F3 & F4	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	Resources: **Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/ Facility:** Acquires, stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership:**communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/ corrects performance; improves;** **Technology: Selects/ Applies/maintains**
2. Build and analyze Octal decoders circuits.			SAME	SAME	SAME	
3. Build and analyze Hex decoders circuits.			SAME	SAME	SAME	
4. Build and analyze BCD to 7-Segment decoder circuits.			SAME	SAME	SAME	
5. Build and analyze simple encoder circuits.			SAME	SAME	SAME	
6. Build and analyze Decimal to BCD encoder circuits.			SAME	SAME	SAME	
7. Build and analyze 8-input priority encoder circuits.			SAME	SAME	SAME	
			(Listening EIF 063; Speaking EIF 023,027; Writing EIF 062)	(EIF 066,067,069,069 072,073,074,075,076,077,078,082,084,085,086,087,089,090)	(EIF 043,044,045, 047,050)	

*(Build the product/device/circuit and show that it performs as expected.)

Occupation: Electronic Technician
Duty Area/Function: ALL

Task Analysis Worksheet

Competency: *Troubleshoot and repair types of digital encoders and decoders. (F.38)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks: 1. Build, analyze and debug BCD to Decimal decoders circuits.		1.Digital Trainer 2.Discrete relevant electronic components. 3.Multimeters 4.Oscilloscopes 5.Logic Probes 6.Logic Analyzer 7.Hand tools 8.Anti-static equipment 9. Data book	ACT Level 5 SCANS f1-d	ACT Level 5 SCANS F3 & F4	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	Resources: **Time**: Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/ Facility:** Acquires, stores, uses materials efficiently; **Interpersonal:** **Team**: Participates as team; **teaches others; Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/ corrects performance; improves; Technology: Selects/ Applies/maintains**
2. Build, analyze and debug Octal decoders circuits.			SAME	SAME	SAME	
3. Build, analyze and debug Hex decoders circuits.			SAME	SAME	SAME	
4. Build, analyze and debug BCD to 7-Segment decoder circuits.			SAME	SAME	SAME	
5. Build, analyze and debug simple encoder circuits.			SAME	SAME	SAME	
6. Build, analyze and debug Decimal to BCD encoder circuits.			SAME	SAME	SAME	
7. Build, analyze and debug 8-input priority encoder circuits.			SAME	SAME	SAME	
			(Listening EIF 063; Speaking EIF 023,027: Writing EIF 062)	(EIF 066,067,069,069 072,073,074,075,076,077,078,082,084,085,086,087,089,090)	(EIF 043,044,045, 047,050)	

*(Use a logical process to find the fault(s) in a product/device/circuit, replace and/or repair the defect and demonstrate corrected operation.)

Occupation: Electronic Technician
Duty Area/Function: ALL

Task Analysis Worksheet

Competency: *Fabricate and demonstrate digital display devices. (F.40)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, infor mation, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks:						

*(Build the product/device/circuit and show that it performs as expected.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:

Competency: *Troubleshoot and repair digital display devices. (F.41)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, infor mation, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks:						

*(Use a logical process to find the fault(s) in a product/device/circuit, replace and/or repair the defect and demonstrate corrected operation.)

MICROPROCESSORS

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:

Competency: *Fabricate and demonstrate types of microprocessor memory circuits. (G.09)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks: 1. Identify fundamentals of central process unit (CPU). 2. Analyze bus structures 3. Analyze memory devices (RAM), read-only memory (ROM), erasable-programmable-read-only-memory (EPROM). 4. Analyze input/output (I/O) devices.			ACT Level 5 SCANS F1-a SAME SAME SAME SAME SAME SAME SAME SAME SAME	ACT Level 4 SCANS F3 SAME SAME SAME SAME SAME SAME SAME SAME SAME	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All SAME SAME SAME SAME SAME SAME SAME SAME SAME	**Resources: Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/ Facility:** Acquires, stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/ corrects performance; improves; Technology: Selects/ Applies/maintains**

*(Build the product/device/circuit and show that it performs as expected.)

Occupation: Electronic Technician

Task Analysis Worksheet

Duty Area/Function:

Competency: *Troubleshoot and repair types of microprocessor memory circuits. (G.10)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks: 1. Identify fundamentals of central process unit (CPU). 2. Analyze bus structures 3. Analyze memory devices (RAM), read-only memory (ROM), erasable programmable read-only-memory (EPROM). 4. Analyze input/output (I/O) devices. 5. Troubleshoot and repair			ACT Level 5 SCANS F1-a SAME SAME SAME SAME SAME SAME SAME SAME SAME	ACT Level 4 SCANS F3 SAME SAME SAME SAME SAME SAME SAME SAME SAME	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All SAME SAME SAME SAME SAME SAME SAME SAME SAME	**Resources**: **Time**: Selects goal-relevant activities; ranks goals: allocates time; Prepares & follows schedule; **Material/ Facility:** Acquires, stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems****: understands systems; monitors/ corrects performance; improves;** **Technology****:** Selects/ Applies/maintains

*(Use a logical process to find the fault(s) in a product/device/circuit, replace and/or repair the defect and demonstrate corrected operation.)

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Occupation: Electronic Technician
Duty Area/Function:

Task Analysis Worksheet

Competency: *Fabricate and demonstrate microprocessor machine code and instruction sets. (G.12)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks: 1. Using DEBUG/MASM design, and write machine language programs on MC6800 microprocessor. 2. Using DEBUG/MASM design, and write machine language programs on 8088 microprocessor.		1. Microcomputer 2. Microprocessor trainer	ACT Level 5 SCANS F1-a SAME (Listening EIF 063; Speaking EIF 023,027) Writing EIF 062)	ACT Level 4 SCANS F3 SAME (EIF 066,067,069 072,073,074 075,076,084 090,)	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All SAME (EIF 043,EIF 044 EIF 047,EIF 050)	**Resources**: **Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/ Facility:** Acquires, stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership:**communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems**: **understands systems; monitors/ corrects performance; improves;** **Technology:** **Selects/ Applies/maintains**

*(Build the product/device/circuit and show that it performs as expected.)

Occupation: Electronic Technician
Duty Area/Function:

Task Analysis Worksheet

Competency: *Troubleshoot and repair microprocessor machine code and instruction sets (G.13)

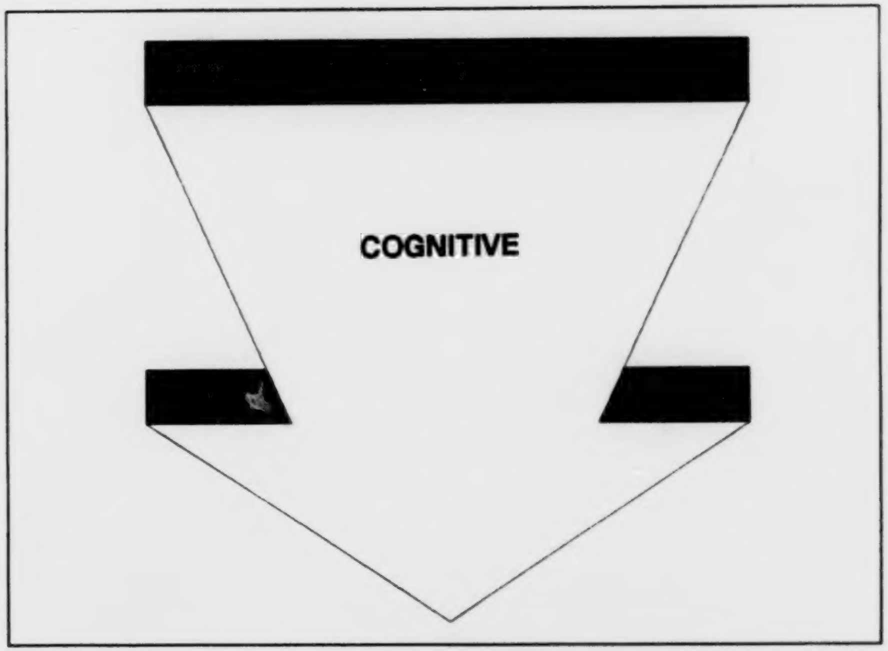
Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills						
Tasks: 1. Using DEBUG/MASM design, write and debug machine language programs on MC6800 microprocessor. 2. Using DEBUG/MASM design, write and debug machine language programs on 8088 microprocessor.		1. Microcomputer 2. Microprocessor trainer	ACT Level 5 SCANS F1-d SAME (Listening EIF 063; Speaking EIF 023,027; Writing EIF 062)	ACT Level 4 SCANS F3 SAME (EIF 066,067,069 072,073,074 075,076,084 090;	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All SAME (EIF 043,EIF 044 EIF 047,EIF 050)	**Resources: Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/ Facility:** Acquires, stores, uses materials efficiently; **Interpersonal: Team:** Participates as team; **teaches others; Leadership:** communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information:** Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/ corrects performance; improves; Technology: Selects/ Applies/maintains**

*(Use a logical process to find the fault(s) in a product/device/circuit, replace and/or repair the defect and demonstrate corrected operation.)

TABLE G

TASK ANALYSIS CROSSWALK

COGNITIVE


COGNITIVE

GENERAL

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function: All

COMPETENCY:* Demonstrate an understanding of proper safety techniques for all types of circuits and components(D.C.circuits, A.C. circuits, Audio systems, Analog circuits, Digital circuits, discrete solid state circuits, microprocessors) and apply proper OSHA standards. (A.01) (Taught in all courses by subject area)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
	Occupational Theory					
Tasks: a. Psychological factors in safety b. Personal Protection equipment Head protection Hearing protection Face and eye protection Footwear Special work clothing c. Hazardous materials safety d. Hazardous locations e. Mechanical safety f. Electrical safety g. Environmental safety h. Thermal safety i. Radiation safety j. Laser safety			ACT Level 4 SCANS: F1-b	ACT Level 4 SCANS F3-a, F4-c	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	**Resources: Time:** Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal: Team:** Participates as team; **teaches others;Leadership**: communicates ideas to justify position, persuades/convinces; responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information; uses computers to process information; **Systems:** understands systems; **Technology:** Chooses, understands

*(Know the technical basis for the workings of a product/device/circuit/procedure and be able to demonstrate that knowledge.)
(Also: Dept. of Army: TRADOC 351-13)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function: All

Competency: *Demonstrate an understanding of proper troubleshooting techniques. (A.02)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
	Occupational Theory					
Specifications of: 1. Assembly component level 2. Board level 3. Component level Tasks: 1. Interpret a. diagnostic flowcharts b. troubleshooting charts c. schematics d. manufacturing upgrade 2. Identify a. symptoms b. appropriate procedures c. test requirements d. test equipment needs e. manual specifications			ACT Level 5 SCANS F1-b	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	**Resources: Time:** Prepares & follows schedule; **Material/Facility:** Acquires, stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others;** **Leadership:** communicates ideas to justify position, persuades/convinces; responsibly challenges; **Works with Diversity:** works with others; **Information:** Acquires, evaluates, organizes, maintains, interprets, communicates information; uses computers to process information; **Systems:** understands systems; **Technology:** Chooses, understands

*(Know the technical basis for the workings of a product/device/circuit/procedure and be able to demonstrate that knowledge.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function: All

COMPETENCY: *Demonstrate an understanding of basic assembly skills using hand and power tools.(A.03

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
	Occupational Theory					
Tasks: Demonstrate uses for all handtools.					ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	

*(Know the technical basis for the workings of a product/device/circuit/procedure and be able to demonstrate that knowledge.)

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Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function: All

COMPETENCY: *Demonstrate an understanding of acceptable soldering/desoldering techniques, including through hole and surface mount devices.(A.04.)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
	Occupational Theory					
Tasks: 1. Define a series circuit		DMM, Handheld Calculator (TI 35 or 36 or equiv.) Proto Board	ACT Level 4 SCANS F1·b	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	**Resources: Time:** Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others;Leadership:** communicates ideas to justify position, persuades/convinces; responsibly challenges; **Works with Diversity:** works with others; **Information:** Acquires, evaluates, organizes, maintains, interprets, communicates information; uses computers to process information; **Systems:** understands systems; **Technology:** Chooses, understands
2. Calculate total resistance, total current and the polarity of the IR drops in series circuits.		Resistors as required	SAME	SAME	SAME	
3. Describe the difference between a voltage rise and a voltage drop, and use of ground as a reference point.		DC Power Supply	SAME	SAME	SAME	
4. Analyze the use of voltage dividers or attenuators to provide several different voltages from one source.		Hook-up wire	SAME	SAME	SAME	
5. List the power distribution rules for series circuits.			SAME	SAME	SAME	

*(Know the technical basis for the workings of a product/device/circuit/procedure and be able to demonstrate that knowledge.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function: All

COMPETENCY: *Demonstrate an understanding of proper solderless connections.A.05.)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
	Occupational Theory					
Tasks:						

*(Know the technical basis for the workings of a product/device/circuit/procedure and be able to demonstrate that knowledge.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function: All

COMPETENCY: *Demonstrate an understanding of use of data books and cross reference/technical manuals to specify and requisition electronic components. (A.08.)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
	Occupational Theory					
Tasks:						

*(Know the technical basis for the workings of a product/device/circuit/procedure and be able to demonstrate that knowledge.)

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Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function: All
COMPETENCY: *Demonstrate an understanding of the interpretation and creation of electronic schematics and technical drawings. (A.07.) (Taught in all courses by subject area)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
	Occupational Theory					
Tasks: 1. Interpret diagnostic flowcharts 2. Interpret troubleshooting charts 3. Interpret schematics a. Identify symbols b. Draw/label a schematic of a circuit board c. Trace a signal/schematic d. Identify system blocks from schematic e. Construct/assemble equipment 4. Diagrams a. one line b. loop sheets c. ladder d. logic e. piping f. instrument g. multipage system 5. Blueprints a. Read/transfer measurements b. Describe application of auxiliary/revolutions/sectional views c. Interpret mechanical/electronic production 6. Interpret spreadsheets						

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Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function: All

COMPETENCY: *Demonstrate an understanding of recording of data, design curves and graphs. (A.08)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
	Occupational Theory					
Tasks:						

*(Know the technical basis for the workings of a product/device/circuit/procedure and be able to demonstrate that knowledge.)

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Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function: All

COMPETENCY: *Demonstrate an understanding of color codes and other component descriptors. (A.09)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
	Occupational Theory					
Tasks:						

*(Know the technical basis for the workings of a product/device/circuit/procedure and be able to demonstrate that knowledge.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function: All

COMPETENCY: *Demonstrate an understanding of site electrical and environmental survey. (A.10.)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
	Occupational Theory					
Tasks:						

*(Know the technical basis for the workings of a product/device/circuit/procedure and be able to demonstrate that knowledge.)

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D.C. Circuits

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Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function: All

COMPETENCY: *Demonstrate an understanding of the relationship of electricity to the nature of matter. (B.01.) (Page 1 of 1)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, inter personal and systems competencies/ skills required)
	Occupational Theory					
Tasks:					ACT Reasoning Level 4 SCANS:	**Resources**: Time: Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others;Leadership**: communicates ideas to justify position, persuades/convinces; responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information; uses computers to process information; **Systems**: understands systems; **Technology:** Chooses, understands
1. Analyze the nature of electricity.			ACT Level 4 SCANS F1-b	ACT Level 5 SCANS F3 & F4	Thinking Skills: All Personal Qualities: All	
2. Explain current flow (conventional and electron).			ACT Level 4 SCANS F1-b	ACT Level 5 SCANS F3 & F4	ACT Level 4 SCANS: Same as 1	
3. Differentiate between voltage and current			ACT Level 4 SCANS F1-b	ACT Level 5 SCANS F3 & F4	ACT Level 4 SCANS: Same as 1	
4. Explain what causes current to move through a conductor.			ACT Level 4 SCANS F1-b	ACT Level 5 SCANS F3 & F4	ACT Level 4 SCANS: Same as 1	
5. Manipulate equations and make calculations involving charged bodies, current and voltage.			ACT Level 4 SCANS F1-b	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: Same as 1	

*(Know the technical basis for the workings of a product/device/circuit/procedure and be able to demonstrate that knowledge.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function: All

COMPETENCY: *Demonstrate an understanding of sources of electricity (DC & AC). (B.02)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
	Occupational Theory					
Tasks:						**Resources:** **Time:** Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others;Leadership:** communicates ideas to justify position, persuades/convinces; responsibly challenges; **Works with Diversity:** works with others; **Information:** Acquires, evaluates, organizes, maintains, interprets, communicates information; uses computers to process information; **Systems:** understands systems; **Technology:** Chooses, understands
1. Analyze functions/parts of batteries			ACT Level 4 SCANS F1-b	ACT Level 5 SCANS F3-a	ACT Reasoning Level 4 SCANS: Thinking Skills: All Personal Qualities: All	
2. Generate electricity with magnetism and understand:			ACT Level 4 SCANS F1-b	ACT Level 4 SCANS F3-a, F4-c	ACT Level 4 SCANS: Same as 1.	
a. Natural/manmade magnets (permanent/ temporary)			SAME	SAME	SAME	
b. Magnetic domains/magnetic fields			SAME	ACT Level 5 SCANS F3-a, F4-c	SAME	
c. Relationship between electrical current and magnetism and solenoid concentration of magnetic field			SAME	SAME	SAME	
d. Relationship between magnetomotive force, magnetic flux, flux density, field intensity and permeability			SAME	ACT Level 6 SCANS F3-a,b; F4-a,c	ACT Level 5 SCANS: Same as 1.	
e. Analyze the B-H curves			SAME	ACT Level 6 SCANS F3-a,b; F4-a,c	SAME	
f. Analyze different losses in electromagnetic circuits			SAME			
3. Generate electricity with pressure			SAME	ACT Level 5 SCANS F3-a, F4-c	ACT Level 4 SCANS: Same as 1.	
4. Generate electricity with heat			SAME	ACT Level 4 SCANS F3-a, F4-c	SAME	
5. Generate electricity with light			SAME	SAME	SAME	

*(Know the technical basis for the workings of a product/device/circuit/procedure and be able to demonstrate that knowledge.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function: All

COMPETENCY: *Demonstrate an understanding of principles and operation of electrochemical supplies.(B.03)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
	Occupational Theory					
Tasks: Explain/identify: 1. Battery 2. Voltaic cells 3. Carbon zinc cell 4. Alkaline cell 5. Summary of dry cells 6. Lithium cell 7. Lead-Acid cell 8. Secondary cells 9. Series/parallel cells 10. Internal Resistance/generator 11. Constant voltage/Constant-Current sources			ACT Level 4 SCANS F1-b	ACT Level 5 SCANS F3 & F4	ACT Level 4 SCANS: Thinking Skills: All Personal Qualities: All	**Resources**: **Time**: Prepares & follows schedule; **Material/Facility**: Acquires, stores, uses materials efficiently; **Interpersonal**: **Team**: Participates as team; **teaches others**; **Leadership**: communicates ideas to justify position, persuades/convinces; responsibly challenges; **Works with Diversity**: works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information; uses computers to process information; **Systems**: understands systems; **Technology**: Chooses, understands

*(Know the technical basis for the workings of a product/device/circuit/procedure and be able to demonstrate that knowledge.)

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Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function: All

COMPETENCY: *Demonstrate an understanding of the meaning of and relationships among and between voltage, current, resistance, power and energy in D.C.(B.04)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
	Occupational Theory					
Tasks:						
1. Explain the relationship between the diameter of a conductor and its specific resistance			ACT Level 4 SCANS F1-b	ACT Level 6 SCANS F3-a,b; F4-a,c	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	**Resources: Time**: Prepares & follows schedule; **Material/Facility**: Acquires,stores, uses materials efficiently; **Interpersonal: Team:** Participates as team; **teaches others;Leadership**: communicates ideas to justify position, persuades/convinces; responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information; uses computers to process information; **Systems:** understands systems; **Technology:** Chooses, understands
2. Describe the relationship between wire size (diameter) and wire gauge (AWG)			ACT Level 4 SCANS F1-b	ACT Level 6 SCANS F3-a,b; F4-a,c	SAME as 1.	
3. Differentiate between a good insulator and a good conductor			ACT Level 4 SCANS F1-b	ACT Level 5 SCANS F3-a, F4-c	SAME as 1.	
4. Describe electrical conduction in gases, liquids, and plasma			ACT Level 4 SCANS F1-b	ACT Level 5 SCANS F3-a, F4-c	SAME as 1.	
5. Explain the use of switches and safety devices in electrical circuits			ACT Level 4 SCANS F1-b	ACT Level 5 SCANS F3-a, F4-c	SAME as 1.	
6. Make calculations of circular mils and of resistance			ACT Level 4 SCANS F1-b	ACT Level 6 SCANS F3-a,b; F4-a,c	SAME as 1.	
7. Apply Kirchhoff's Current Law (KCL)			ACT Level 4 SCANS F1-b	ACT Level 6 SCANS F3-a,b; F4-a,c	SAME as 1.	
8. Apply Kirchhoff's Voltage Law (KVL)			ACT Level 4 SCANS F1-b	ACT Level 6 SCANS F3-a,b; F4-a,c	SAME as 1.	

*(Know the technical basis for the workings of a product/device/circuit/procedure and be able to demonstrate that knowledge.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function: All

COMPETENCY: *Demonstrate an understanding of measurement of resistance of conductors and insulators and the computation of conductance.(B.05)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
	Occupational Theory					
Tasks: 1. Explore the relationship between the diameter of a conductor and its specific resistance.			ACT Level 4 SCANS F1-b	ACT Level 5 SCANS F3-a, F4-c	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	**Resources:** **Time:** Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others;Leadership:** communicates ideas to justify position, persuades/convinces; responsibly challenges; **Works with Diversity:** works with others; **Information:** Acquires, evaluates, organizes, maintains, interprets, communicates information; uses computers to process information; **Systems:** understands systems; **Technology:** Chooses, understands
2. Describe the relationship between wire size (diameter) and wire gauge (AWG).			SAME	SAME	SAME	
3. Differentiate between a good insulator and a good conductor.			SAME	SAME	SAME	
4. Describe electrical conduction in gasses, liquids and plasma.			SAME	SAME	SAME	
5. Explore the use of switches and safety devices in electrical circuits.			SAME	SAME	SAME	
6. Make calculations of circular mils and of resistance.			SAME			

*(Know the technical basis for the workings of a product/device/circuit/procedure and be able to demonstrate that knowledge.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function: All

COMPETENCY: *Demonstrate an understanding of Ohms Law to series, parallel and series-parallel circuits (B.08.)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal & systems skills/ competencies required)
	Occupational Theory					
Tasks: 1. Calculate the current in a series circuit given resistance and applied voltage.			ACT Level 4 SCANS F1-b	ACT Level 6 SCANS F3-a,b; F4 a,c	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	**Resources: Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership**: communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information; uses computers to process information; **Systems: understands systems;monitors/ corrects performance; improves; Technology: Selects/Applies**
2. Explain the relationship between resistance, current flow and voltage drops in an electric circuit.			SAME	SAME	SAME	
3. Calculate the amount of resistance necessary to drop a voltage to a desired level.			SAME	SAME	SAME	
4. Manipulate equations and solve problems using Ohm's law.			SAME	SAME	SAME	
5. Determine and use the proper prefixes associated with electronic terms (Powers of ten expressed in units of 3).			SAME	SAME	SAME	

*(Know the technical basis for the workings of a product/device/circuit/procedure and be able to demonstrate that knowledge.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function: All

COMPETENCY: ***Demonstrate an understanding of magnetic properties of circuits and devices. (B.07).**

Technology	Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal & systems skills/ competencies required)
Occupational Theory					
Tasks: 1. Differentiate between natural and artificial (manmade) magnets and divide them further into permanent and temporary types.		ACT Level 4 SCANS F1-b	Act Level 5 SCANS F3-a, F4-c	ACT Level 4 SCANS: Thinking Skills: All Personal Qualities: All	**Resources: Time**: Selects goal relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal: Team:** Participates as team; **teaches others; Leadership**: communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information; uses computers to process information; **Systems: understands systems;monitors/corrects performance; improves; Technology:** Selects/ Applies
2. Explain magnetic domains and how they affect magnetic field to include polarity and field direction.		SAME	SAME	SAME	
3. Describe the relationship between electrical current and magnetism and solenoid concentration of a magnetic field.		SAME	ACT Level 6 SCANS F#-a,b; F4-a,c	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	
4. Describe the relationship between magnetomotive force, magnetic flux, flux density, field intensity and permeability.		SAME	SAME	SAME	
5. Analyze the B-H curves and the different losses encountered in electromagnetic circuits.		SAME	SAME	SAME	

*(Know the technical basis for the workings of a product/device/circuit/procedure and be able to demonstrate that knowledge.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function: All

COMPETENCY: *Demonstrate an understanding of the physical, electrical characteristics of capacitors and inductors. (B.08)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
	Occupational Theory					
Tasks: 1. Explain the principles of energy storage in an electrostatic field and charging and discharging action of a capacitor.			ACT Level 4 SCANS F1-b	ACT Level 5 SCANS F3 & F4	ACT Level 4 SCANS: Thinking Skills: All Personal Qualities: All	Resources: Time: Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/ Facility:** Acquires, stores, uses materials efficiently; Interpersonal: Team: Participates as team; **teaches others; Leadership**: communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; Information: Acquires, evaluates, organizes, maintains, interprets, communicates information; uses computers to process information; Systems: understands systems;monitors/ corrects performance; improves; Technology: Selects/Applies
2. List the unit of measure for and the physical factors affecting capacitance (dielectric constant, area of plates, etc).			SAME	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: SAME	
3. Classify the different types of capacitors, losses encountered and voltage ratings.			SAME	ACT Level 5 SCANS F3 & F4	ACT Level 4 SCANS: SAME	
4. Explain the capacitor coding system and the relationship between frequency and capacitance characteristics.			SAME	SAME	SAME	

*(Know the technical basis for the workings of a product/device/circuit/procedure and be able to demonstrate that knowledge.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function: All

COMPETENCY: *Demonstrate an understanding of the maximum power transfer theory. (B.09)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, inter personal and systems competencies/ skills required)
	Occupational Theory					
Tasks: 1. Identify a series circuit.			ACT Level 4 SCANS F1-b	ACT Level 5 SCANS F3-a, F4-c	ACT Level 4 SCANS: Thinking Skills: All Personal Qualities: All	Resources: Time: Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; Material/ Facility: Acquires, stores, uses materials efficiently; Interpersonal: Team: Participates as team; teaches others; Leadership: communicates ideas to justify position, persuades/ convinces; responsibly challenges; Works with Diversity: works with others; Information: Acquires, evaluates, organizes, maintains, interprets, communicates information; uses computers to process information; Systems: understands systems; monitors/ corrects performance; improves; Technology: Selects/Applies
2. Calculate total resistance, total current and the polarity of the IR drops in series circuits.			SAME	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: SAME	
3. Explain the difference between a voltage rise and a voltage drop, and the use of ground as a reference point.			SAME	SAME	SAME	
4. Analyze the use of voltage dividers or alternators to provide several different voltages from one source.			SAME	SAME	SAME	
5. List/explain the power distribution rules for series circuits.			SAME	SAME	SAME	
6. Analyze the effects of internal resistance on maximum power transfer from source to load.			SAME	SAME	SAME	

*(Know the technical basis for the workings of a product/device/circuit/procedure and be able to demonstrate that knowledge.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function: All

COMPETENCY: *Understand principles and operations of DC series circuits. (B.10)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
	Occupational Theory					
Tasks: 1. Explain a series circuit.			ACT Level 4 SCANS F1-b	ACT Level 5 SCANS F3-a, F4-c	ACT Level 4 SCANS: Thinking Skills: All Personal Qualities: All	**Resources: Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/ Facility:**Acquires, stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership;**communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information; uses computers to process information; **Systems: understands systems; monitors/corrects performance;improves Technology: Selects/Applies**
2. Calculate total resistance, total current and the polarity of the IR drops in series circuits.			SAME	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: SAME	
3. Explain the difference between a voltage rise and a voltage drop, and the use of ground as a reference point.			SAME	SAME	SAME	
4. Analyze the use of voltage dividers or alternators to provide several different voltages from one source.			SAME	SAME	SAME	
5. Explain the power distribution rules for series circuits.			SAME	SAME	SAME	

*(Know the technical basis for, and be able to explain how, the product/device/circuit works)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function: All

COMPETENCY: *Understand principles and operations of DC parallel circuits. (B.13)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/skills required)
	Occupational Theory					
Tasks: 1. Define/explain a parallel circuit.			ACT Level 4 SCANS F1-b	ACT Level 5 SCANS F3 & F4	ACT Level 4 SCANS: Thinking Skills: All Personal Qualities: All	**Resources:** **Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others;** **Leadership:**communicates ideas to justify position, persuades/ convinces;responsibly [illegible] **Works** [illegible] works [illegible] Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems:** **understands systems;monitors/ corrects performance; improves;****Technology:** **Selects/Applies**
2. Calculate total current in parallel circuits.			SAME	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: SAME	
3. Calculate total resistance in parallel circuits			SAME	SAME	SAME	
4. Analyze power distribution in parallel circuits.			SAME	SAME	SAME	

*(Know the technical basis for, and be able to explain how, the product/device/circuit works)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function: All

COMPETENCY: *Understand the principles and operations of DC series-parallel and bridge circuits. (B.16)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
	Occupational Theory					
Tasks: 1. identify/explain a series-parallel arrangement of components.			ACT Level 4 SCANS F1-b	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	**Resources: Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires, stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems;**monitor
2. Simplify components into a single equivalent resistance.			SAME	SAME	SAME	
3. Analyze a series-parallel circuit			SAME	SAME	SAME	
4. Make calculations to determine total resistance.			SAME	SAME	SAME	
5. Make calculations to determine voltage and current distribution.			SAME	SAME	SAME	

*(Build the product/device/circuit and show that it performs as expected.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function: All

Competency: *Understand principles and operations of DC voltage divider circuits (Loaded and Unloaded).(B.19)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, infor mation, interpersonal and systems competencies/ skills required)
	Occupational Theory					
Tasks:						**Resources: Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership:**communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems;**monitor
1. Identify/explain a series parallel arrangement of components.			ACT Level 4 SCANS F1-b	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	
2. Simplify components into a single equivalent resistance.			SAME	SAME	SAME	
3. Analyze a series parallel circuit			SAME	SAME	SAME	
4. Make calculations to determine total resistance.			SAME	SAME	SAME	
5. Make calculations to determine voltage and current distribution.			SAME	SAME	SAME	

*(Know the technical basis for, and be able to explain how, the product/device/circuit works)

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Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function: All

Competency: *Understand principles and operations of DC RC and RL circuits.(B.22)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal & systems competencies/skills required)
	Occupational Theory					
Tasks: 1. Calculate time constants for RC circuits.			ACT Level 4 SCANS F1-b	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	Resources: Time: Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/ Facility:** Acquires, stores, uses materials efficiently; **Interpersonal: Team:** Participates as team; **teaches others; Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems;monitors/ corrects performance; improves;Technology: Selects/Applies/maintains**
2. Calculate charge/discharge times for RC circuits.			SAME	SAME	SAME	
3. Calculate the effects of R and C on charging time.			SAME	SAME	SAME	
4. Graph the different charging times based on time constants.			SAME	SAME	SAME	
5. Graph the different charging times based on voltage amplitude.			SAME	SAME	SAME	
6. Calculate time constants for RL circuits.			SAME	SAME	SAME	
7. Explain the voltage transients produced in RL circuits.			SAME	SAME	SAME	
8. Analyze the universal time constant curve.			SAME	SAME	SAME	
9. Explain the universal time constant curve application to the study of RC and RL time constant circuits.			SAME	SAME		
10.Document the effects of long and short time constants on square wave voltages.			SAME	SAME	SAME	

*(Know the technical basis for, and be able to explain how, the product/device/circuit works)

AC CIRCUITS

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Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:

Competency: *Demonstrate an understanding of the properties of an AC signal. (C.01)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	Competencies (List resources, information, interpersonal & systems competencies/skills required)
	Occupational Theory					
Tasks:					ACT Level 5 SCANS:	Resources: Time: Selects goal relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/ Facility:** Acquires, stores, uses materials efficiently; Interpersonal: Team: Participates as team; **teaches others; Leadership:** communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; Information: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems;monitors/ corrects performance; improves; Technology: Selects/Applies/maintains**
1. Analyze the basic principles of AC generation.			ACT Level 4 SCANS F1-b	ACT Level 6 SCANS F3 & F4	Thinking Skills: All Personal Qualities: All	
2. Define a cycle of AC in terms of alternations, degrees, and radians.			SAME	SAME	SAME	
3. Consider AC from the aspects of frequency, angular velocity, period, and wavelength.			SAME	SAME	SAME	
4. Recognize the difference between AC and DC symbols.			SAME	SAME	SAME	
5. Determine to peak to peak, peak, average and effective (RMS) values of sine wave voltages.			SAME	SAME	SAME	

*(Know the technical basis for the workings of a product/device/circuit/procedure and be able to demonstrate that knowledge.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:

Competency: *Demonstrate an understanding of the principles of operation and characteristics of sinusoidal and non sinusoidal wave forms. (C.02)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	Competencies (List resources, information, interpersonal & systems competencies/skills required)
	Occupational Theory					
Tasks: 1. Analyze the basic principles of AC generation.			ACT Level 4 SCANS F1-b	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	**Resources**: **Time**: Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/ Facility:** Acquires, stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others;** **Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems**: **understands systems;monitors/ corrects performance; improves;** **Technology**: **Selects/Applies/maintains**
2. Define a cycle of AC in terms of alternations, degrees, and radians.			SAME	SAME	SAME	
3. Consider AC from the aspects of frequency, angular velocity, period, and wavelength.			SAME	SAME	SAME	
4. Recognize the difference between AC and DC symbols.			SAME	SAME	SAME	
5. Determine to peak to peak, peak, average and effective (RMS) values of sine wave voltages.			SAME	SAME	SAME	
6. Analyze vector and phaser values as they apply to AC circuits.			SAME	SAME	SAME	
7. Evaluate the applications of polyphase voltages,			SAME	SAME	SAME	
8. Differentiate between the various types of AC voltages (nonsinusoidal).			SAME	SAME	SAME	

*(Know the technical basis for the workings of a product/device/circuit/procedure and be able to demonstrate that knowledge.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:

Competency: *Demonstrate an understanding of basic motor/generator theory and operation. (C.03)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, inter personal and systems competencies/ skills required)
	Occupational Theory					
Tasks: 1. Knowledge of Basic Components of generators/motors a. Field windings b. Armature c. Brushes d. Commutator (D.C.) c. Sup Rings (A.C.) 2. Application of Lenz's and Faraday's Laws to electromagnetic induction 3. Knowledge of the relationship between magnetism & current flow in a conductor		DMM, Galvano meter, Perman ENNT magnets (Horseshoe & Bar)	ACT Level 4 SCANS F1-b	ACT Level 5 SCANS Level F3 & F4	ACT Level 4 SCANS: Thinking Skills: All Personal Qualities: All	**Resources**: Time: Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses compute to process information **Systems****: understands systems;**monitor

*(Know the technical basis for the workings of a product/device/circuit/procedure and be able to demonstrate that knowledge.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:

Competency: *Demonstrate an understanding of measurement of power in AC and DC circuits. (C.04)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
	Occupational Theory					
Tasks: 1. Differentiate between true and apparent power and the power factor in AC circuits. 2. Recognize the differences between AC and DC meters and the application of Wattmeters.			ACT Level 4 SCANS F1-b SAME	ACT Level 5 SCANS Level F3 & F4 SAME	ACT Level 4 SCANS: Thinking Skills: All Personal Qualities: All SAME	**Resources: Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal: Team:** Participates as team; **teaches others; Leadership:**communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems;**monitor

*(Know the technical basis for the workings of a product/device/circuit/procedure and be able to demonstrate that knowledge.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:

Competency: *Demonstrate an understanding of the principle and operations of various power conditioning: (isolation transformers, surge suppressors, uninterruptable power systems) (C.05)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources,information, interpersonal and systems competencies/ skills required)
	Occupational Theory					
Tasks: 1. Identify the different types of transformers.			ACT Level 4 SCANS F1-b	ACT Level 5 SCANS F3 & F4	ACT Level 4 SCANS: Thinking Skills: All Personal Qualities: All	**Resources: Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others;** **Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems;**monitor
2. Analyze transformer principles.			SAME	SAME	SAME	
3. Evaluate the application of Autotransformers, the requirements for Isolation transformers and how the use of one dictates the use of the other.			SAME	SAME	SAME	
4. Explain the Transformer Connections for Three-Phase circuits.			SAME	SAME	SAME	

*(Know the technical basis for the workings of a product/device/circuit/procedure and be able to demonstrate that knowledge.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:

Competency: *Demonstrate an understanding of the principle and operation of safety grounding systems: (lighting arresters, ground fault interrupters, etc.). (C.06)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/skills required)
	Occupational Theory					
Tasks: Grounding: A. Connects one side of AC series to earth for safety. (1) Against shock (2) Against excessive high Voltage due to lightening. B. Lightening Arrestor (1) Spark Gap devices installed by power companies to safety discharge strikes. C. Ground Fault Intemplers (GFI's) Senses excessive current (usually 5 amp or greater) and opens circuit as a protection against shock.			ACT Level 4 SCANS F1-b	ACT Level 5 SCANS F3 & F4	ACT Level 4 SCANS: Thinking Skills: All Personal Qualities: All	**Resources: Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems;**monitor

*(Know the technical basis for the workings of a product/device/circuit/procedure and be able to demonstrate that knowledge.)

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Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:

Competency: *Understand principles and operations of AC capacitive circuits. (C.07)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
	Occupational Theory					
Tasks: 1. Calculate capacitive reactance. 2. Calculate total reactances for series circuits. 3. Calculate total reactances for parallel circuits. 4. Graph the relationship between capacitive reactance and frequency. 5. Determine the phase relationship between voltage and current in a capacitive circuit. 6. Evaluate power in a purely capacitive circuit. 7. Manipulate equations and solve problems associated with reactive circuits.			ACT Level 4 SCANS F1-b	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	**Resources: Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership:**communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information:** Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems;**monitor

*(Know the technical basis for, and be able to explain how, the product/device/circuit works)

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Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:

Competency: *Understand principles and operations of AC inductive circuits. (C.10)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
	Occupational Theory					
Tasks: 1. Construct inductive circuits			ACT Level 4 SCANS F1-b	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	**Resources: Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others;** **Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems;improves;** **Technology:** **Selects/Applies**/maintains/troubleshoots
2. Measure currents.			SAME	SAME	SAME	
3. Measure voltage.			SAME	SAME	SAME	
4. Measure reactance.			SAME	SAME	SAME	

*(Know the technical basis for, and be able to explain how, the product/device/circuit works)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:

Competency: *Understand principles and operations of AC inductive circuits. (C.13)

Technology	Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Occupational Theory					
Tasks:				ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	**Resources: Time**: Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems;improves;** **Technology:** **Selects/Applies**/maintains/troubleshoots
1. Explain principles of mutual inductance		ACT Level 4 SCANS F1-b	ACT Level 6 SCANS F3 & F4		
2. Explain coefficient of coupling		SAME	SAME	SAME	
3. Calculate turns ratio for current					
4. Calculate turns ratio for voltage		SAME	SAME	SAME	
5. Calculate turns ratio for impedance		SAME	SAME	SAME	
6. Determine losses (core, current)		SAME	SAME	SAME	

*(Know the technical basis for, and be able to explain how, the product/device/circuit works)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:
Competency: *Understand principles and operations of AC differentiator and integrator circuits (determine RC and RL time constants) (C.16)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/skills required)
	Occupational Theory					
Tasks: 1. Calculate time constants for RC circuits.			ACT Level 4 SCANS F1-b	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	**Resources: Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/ Facility:** Acquires, stores, uses materials efficiently; **Interpersonal: Team:** Participates as team; **teaches others; Leadership:** communicates ideas to justify position, persuades/ convinces; responsibly challenges; **Works with Diversity:** works with others; **Information:** Acquires, evaluates, organizes, maintains, interprets, communicates information; uses computer to process information **Systems: understands systems; monitors/ corrects performance; improves; Technology: Selects/Applies/maintains**
2. Calculate charge/discharge times for RC circuits.			SAME	SAME	SAME	
3. Calculate the effects of R and C on charging time.			SAME	SAME	SAME	
4. Graph the different charging times based on time constants.			SAME	SAME	SAME	
5. Graph the different charging times based on voltage amplitude.			SAME	SAME	SAME	
6. Calculate time constants for RL circuits.			SAME	SAME	SAME	
7. Explain the voltage transients produced in RL circuits.			SAME	SAME	SAME	
8. Analyze the universal time constant curve.			SAME	SAME	SAME	
9. Explain the universal time constant curve application to the study of RC and RL time constant circuits.			SAME	SAME	SAME	
10. Document the effects of long and short time constants on square wave voltages.			SAME	SAME		

*(Know the technical basis for, and be able to explain how, the product/device/circuit works)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:
Competency: *Understand principles and operations of AC series and parallel resonant circuits (C.19)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
	Occupational Theory					
Tasks: 1. Explain Resonance.			ACT Level 4 SCANS F1 b	ACT Level 5 SCANS F3 & F4	ACT Level 4 SCANS: Thinking Skills: All Personal Qualities: All	**Resources: Time**: Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/ Facility:** Acquires, stores, uses materials efficiently; **Interpersonal: Team:** Participates as team; **teaches others; Leadership:** communicates ideas to justify position, persuades/ convinces; responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information; uses computer to process information **Systems: understands systems; monitors/ corrects performance; improves; Technology:** Selects/ Applies/maintains
2. Analyze Series Resonant Circuits including the basic characteristics.			SAME	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: SAME	
3. Evaluate the Q of a resonant circuit and its effects on the circuit including how it may be changed.			SAME	SAME	SAME	
4. Evaluate the Q effects on circuit bandwidth.			SAME	SAME	SAME	
5. Explore the concepts of an Ideal Parallel Resonant Circuit.			SAME	SAME	SAME	
6. Compare the concepts of an Ideal Parallel Resonant Circuit to a Practical Parallel Resonant Circuit.			SAME	SAME	SAME	
7. Analyze Parallel Resonant Circuits.			SAME	SAME	SAME	
8. Compare Parallel Resonant Circuits with Series Resonant Circuits.			SAME	SAME	SAME	
9. Analyze the effects of dampening a parallel resonant circuit including how it affects the Q and bandwidth of the circuit.			SAME	SAME	SAME	

*(Know the technical basis for, and be able to explain how, the product/device/circuit works)

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Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:

Competency: *Understand principles and operations of AC series and parallel resonant circuits (C.19)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
	Occupational Theory					
Tasks: 10.Analyze the frequency response curves of a resonant circuit.			ACT Level 4 SCANS F1-b	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	**Resources: Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/corrects performance; improves; Technology: Selects/ Applies/maintains**
11.Analyze the Bandwidth of a resonant circuit.			SAME	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: SAME	
12.Analyze the Bandpass of a resonant circuit.			SAME	SAME	SAME	
13.Analyze the relative amplitudes of the voltages, currents and impedances used to establish the limits of the curves.			SAME	SAME	SAME	
14.Evaluate Tuning, Bandspreading and the advantages of Multiple Tuned Stages.			SAME	SAME	SAME	

*(Know the technical basis for, and be able to explain how, the product/device/circuit works)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:

Competency: *Understand principles and operations of AC RC, RL, and RLC circuits (C.22)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, inter personal and systems competencies/ skills required)
	Occupational Theory					
Tasks: 1. Perform vector algebra addition, subtraction, multiplication and division and solve reactive circuits using these procedures.			ACT Level 4 SCANS F1-b	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	**Resources:** Time: Selects goal relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others;** **Leadership:**communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information:** Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/corrects performance; improves;** **Technology:** Selects/ Applies/maintains
2. Perform rectangular to Polar and Polar to Rectangular conversion in the solution of reactive circuits.			SAME	SAME	ACT Level 5 SCANS: SAME	
3. Compare the different methods for determining impedance (Z) in series and parallel circuits and methods for reducing these circuits to a simple series equivalent circuit.			SAME	SAME	SAME SAME	
4. Solve for impedance (Z) of parallel reactive circuits using conductance, susceptance and admittance (minimum coverage).			SAME	SAME	SAME	
5. Solve for impedance in complex series parallel AC networks.			SAME	SAME	SAME	
6. Apply Thevenin's and Norton's Theorems to the solutions of AC circuits.			SAME	SAME	SAME	

*(Know the technical basis for, and be able to explain how, the product/device/circuit works).

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:

COMPETENCY: *Understand principles and operations of AC frequency selective filter circuits. (C.25)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/skills required)
	Occupational Theory					
Tasks:						**Resources:** Time: Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others;** **Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/corrects performance; improves;** **Technology:** Selects/ Applies/maintains
1. Recognize High-Pass filters by component types and placement, their application and their frequency response curves.			ACT Level 4 SCANS F1-b	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: SAME	
2. Recognize Low-Pass filters by component types and placement, their application and their frequency response curves.			SAME	SAME	SAME	
3. Recognize Bandpass filters by component types and placement, their application and their frequency response curves.			SAME	SAME	SAME	
4. Analyze Constant-K and m-Derived filters and their equipment.			SAME	SAME	SAME	
5. Solve for component values in filter circuits as appropriate.			SAME	SAME	SAME	

*(Know the technical basis for, and be able to explain how, the product/device/circuit works).

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:

COMPETENCY: *Understand principles and operations of AC polyphase circuits. (C.28)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/skills required)
	Occupational Theory					
Tasks: Definitions: A. Single Phase 120v B. Two Phase 240v C. Three Phase 208v (Edison System) Color Coding A. Three wire 120v - 240v residential B. Three Phase 208v - Service Local Electrical Codes National Electrical Codes (Polyphase electrical services are not normally taught as a part of course in this area except as an introductory part. What goes on behind the 120/240/208v outlet is a course all by itself)			ACT Level 4 SCANS F1-b	ACT Level 5 SCANS F3 & F4	ACT Level 5 SCANS: SAME	**Resources: Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others;** **Leadership:**communicates ideas to justify position, persuades/convinces;responsibly challenges; **Works with Diversity:** works with others; **Information:** Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/corrects performance; improves;** **Technology:** Selects/ Applies/maintains

*(Know the technical basis for, and be able to explain how, the product/device/circuit works).

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:

COMPETENCY: *Understand principles and operations of AC phase locked loop circuits. (C.31)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
	Occupational Theory					
Tasks: This is beyond the scope of currently taught communications courses at the community college level. It is usually taught as part of radar and/or robotics courses.						

*(Know the technical basis for, and be able to explain how, the product/device/circuit works).

DISCRETE SOLID STATE DEVICES

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Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:

COMPETENCY: *Demonstrate an understanding of the properties of semiconductor materials. (D.01)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
	Occupational Theory					
Tasks:						**Resources:** Time: Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others;** **Leadership:**communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information:** Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/corrects performance; improves;** **Technology:** Selects/ Applies/maintains
1. Explain the relationship between valence band electrons & conductivity.			ACT Level 4 SCANS F1-b	ACT Level 5 SCANS F3 & F4	ACT Level 5 SCANS: SAME	
2. Describe covalent bonding			SAME	SAME	SAME	
3. Explain the purpose of doping			SAME	SAME	SAME	
4. List the most commonly used semiconductor materials			SAME	SAME	SAME	
5. Differentiate between N-type & P-type materials			SAME	SAME	SAME	
6. Discuss the relationship between temperature & conduction.			SAME	SAME	SAME	

*(Know the technical basis for the workings of a product/device/circuit/procedure and be able to demonstrate that knowledge.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:

COMPETENCY: *Demonstrate an understanding of PN junctions. (D.02)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/skills required)
	Occupational Theory					
Tasks:						**Resources:** **Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/corrects performance; improves; Technology: Selects/ Applies/maintains**
1. Discuss the formation of the deplectin layer around a PN junction			ACT Level 4 SCANS F1-b	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: SAME	
2. Recognize forward bias & its effects on depletion layer width & junction resistance & current.			SAME	SAME	SAME	
3. Recognize reverse bias & its effects on depletion layer width & junction resistance & current.			SAME	SAME	SAME	
4. Compare & contrast the three diode models (approximately)			SAME	SAME	SAME	
5. List the main parameters & electrical characteristics of the PN junction diode as found on device specifications sheets.			SAME	SAME	SAME	

*(Know the technical basis for the workings of a product/device/circuit/procedure and be able to demonstrate that knowledge.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:

COMPETENCY: *Demonstrate an understanding of bipolar transistors. (D.03)(Page 1 of 2)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/skills required)
	Occupational Theory					
Tasks: 1. Explain basic bipolar transistor theory & operation			ACT Level 5 SCANS F1-d	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: SAME	**Resources:** Time: Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others;** **Leadership:** communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information:** Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/corrects performance; improves;** **Technology:** Selects/ Applies/maintains
2. Recognize & draw the schematic symbols for NPN & the PNP transistors.			SAME	SAME	SAME	
3. Calculate the three transistor currents & describe how they interrelate.			SAME	SAME	SAME	
4. State the three operating regions of the transistor.			SAME	SAME	SAME	
5. Describe the characteristics of a saturated transistor.			SAME	SAME	SAME	
6. Describe the characteristics of a transistor that is in cutoff.			(EIF 056,057,058,059, 060) (Listening 5 EIF 063; Writing 4 EIF 062)	(EIF 070,071,072,074, 075,076,077, 078,081, 084,086,087,089)		
7. Compare the three basis transistor configurations.						
8. Explain the operation of a transistor using its collector curves.						
9. Describe the effects temperature has on a transistor's beta and DC collector current.						

*(Know the technical basis for the workings of a product/device/circuit/procedure and be able to demonstrate that knowledge.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:

COMPETENCY: *Demonstrate an understanding of bipolar transistors. (D.03)(Page 2 of 2)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/skills required)
	Occupational Theory					
Tasks: 10. Identify the most commonly used parameters & electrical characteristics for a BJT using a manufacturer's data (spec.) sheet. 11. Compare small-signal transistors, high voltage transistors, high current & high Power transistors. 12. Plot collector curves after compiling empirical data. 13. Test a transistor using an ohmmeter to determine if the device is defective & to locate the base lead.			ACT Level 5 SCANS F1-d SAME SAME SAME SAME (EIF 056,057,058,059, 060) (Listening 5 EIF 063; Writing 4 EIF 062)	ACT Level 6 SCANS F3 & F4 SAME SAME SAME SAME (EIF 070,071,072,074, 075,076,077, 078,081, 084,086,087,089)	ACT Level 5 SCANS: SAME SAME SAME SAME SAME	**Resources: Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires, stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others;** **Leadership:** communicates ideas to justify position, persuades/ convinces; responsibly challenges; **Works with Diversity:** works with others; **Information:** Acquires, evaluates, organizes, maintains, interprets, communicates information; uses computer to process information **Systems: understands systems; monitors/corrects performance; improves;** **Technology:** **Selects/ Applies/maintains**

*(Know the technical basis for the workings of a product/device/circuit/procedure and be able to demonstrate that knowledge.)

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Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:

COMPETENCY: *Demonstrate an understanding of field effect transistors (FET's/MOS-FET's) (D.04)(Page 1 of 4)

Technology	Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/skills required)
Occupational Theory					
Tasks:	EIF 02,08, 014, 015, 022				**Resources: Time**: Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/corrects performance; improves; Technology:** Selects/ Applies/maintains
1. Describe the physical construction, the schematic symbols and the supply voltage polarities of the N-channel junction FET and the P-channel junction FET.		ACT Level 5 SCANS F1-d	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: SAME	
2. Explain the relationship between gate-source voltage, channel width, drain current, and drain-source voltage.		SAME	SAME	SAME	
3. Interpret a set of drain curves and identify the OHMIC Pinch Off and the constant current regions.		SAME	SAME	SAME	
4. List the most important parameters of JFETs & state their significance.		SAME	SAME	SAME	
5. Define transconductance & plot a transconductance curve for a given JFET.		SAME	SAME	SAME	
6. Compare & contrast gate-bias, self-bias, & voltage-divider bias.		SAME	SAME	SAME	
7. Explain the common-square amplifier response to an AC input voltage		SAME (EIF 056,057,058,059, 060)(Listening 5 EIF 063;Writing 4 EIF 062)	SAME (EIF 070,071,072,074, 075,076,077, 078,081, 084,086,087,089)	SAME	

*(Know the technical basis for the workings of a product/device/circuit/procedure and be able to demonstrate that knowledge.)

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Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:

COMPETENCY: ***Demonstrate an understanding of field effect transistors (FET's/MOS-FET's) (D.04)(Page 2 of 4)**

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/skills required)
	Occupational Theory					
Tasks:		EIF 02,08, 014, 015, 022				**Resources**: **Time**: Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility**: Acquires,stores, uses materials efficiently; **Interpersonal:** **Team**: Participates as team; **teaches others; Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity**: works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/corrects performance; improves; Technology: Selects/ Applies/maintains**
8. List the gain & impedance features of the common-gate amplifier & of the common-drain amplifier.			ACT Level 5 SCANS F1-d	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: SAME	
9. Describe the physical construction & operating modes of a DE-MOSFET.			SAME	SAME	SAME	
10. Compare the depletion mode operation of a DE-MOSFET with its operation in the enhancement mode.			SAME	SAME	SAME	
11. Plot the transconductance curve(s) for a DE-MOSFET.			SAME	SAME	SAME	
12. Describe the physical construction & operating principles of the E-MOSFET.			SAME	SAME	SAME	
13. Calculate the GM constant "k" for a given MOSFET & the value of drain current for a given value of gate-source.			SAME	SAME	SAME	
14. Describe the biasing circuits most commonly used for D-MOS & E-MOS device circuits.			SAME (EIF 056,057,058,059, 060)(Listening 5 EIF 063;Writing 4 EIF 062)	SAME (EIF 070,071,072,074, 075,076,077, 078,081, 084,086,087,089)	SAME	

*(Know the technical basis for the workings of a product/device/circuit/procedure and be able to demonstrate that knowledge.)

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Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:

COMPETENCY: *Demonstrate an understanding of field effect transistors (FET's/MOS-FET's) (D.04)(Page 3 of 4)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/skills requireu)
	Occupational Theory					
Tasks:		EIF 02,08, 014, 015, 022				**Resources**: Time: Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership**:communicates ideas to justify position, persuades/convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/corrects performance; improves;** **Technology: Selects/Applies/maintains**
15. Discuss the unique features & applications of the dual gate MOSFET, VMOS, LDMOS & the CMOS inverter.			ACT Level 5 SCANS F1-d	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: SAME	
16. Compare the transconductance curves & the drain curves of the JFET D-MOSFET, and E-MOSFET.			SAME	SAME	SAME	
17. List applications for D-MOSFET & E-MOSFET.			SAME	SAME	SAME	
18. Describe, construct, and analyze the BJT switch.			SAME	SAME	SAME	
19. Describe & analyze the operation of the JFT switch & the MOSFET switch.			SAME	SAME	SAME	
20. Describe and calculate phase width, duty cycle & propagation delay.			SAME	SAME	SAME	
21. Measure delay time, rise time, storage time, & fall time with an oscilloscope.			SAME (EIF 056,057,058,059, 060)(Listening 5 EIF 063;Writing 4 EIF 062)	SAME (EIF 070,071,072,074, 075,076,077, 078,081, 084,086,087,089)	SAME	

*(Know the technical basis for the workings of a product/device/circuit/procedure and be able to demonstrate that knowledge.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:

COMPETENCY: *Demonstrate an understanding of field effect transistors (FET's/MOS-FET's) (D.04)(Page 4 of 4)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/skills required)
	Occupational Theory					
Tasks:		EIF 02,08, 014, 015, 022				**Resources**: Time: Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/corrects performance; improves; Technology:** Selects/ Applies/maintains
22. Compare the free-running, one-shot, and bistable multivibrators.			ACT Level 5 SCANS F1-d	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: SAME	
23. Describe the 555 timer, its internal operation & its primary applications.			SAME	SAME	SAME	
24. Describe the operation of the monostable (one shot) multivibrator.			SAME	SAME	SAME	
25. Describe the operation of the astable (free-running) multivibrator.			SAME	SAME	SAME	
26. Construct a free-running multivibrator circuit and demonstrate the effects of external component changes on the output signal.			SAME	SAME	SAME	
27. Test a JFET functionally with an ohmmeter.			SAME (EIF 056,057,058,059, 060)(Listening 5 EIF 063;Writing 4 EIF 062)	SAME (EIF 070,071,072,074, 075,076,077, 078,081, 084,086,087,089)	SAME	

*(Know the technical basis for the workings of a product/device/circuit/procedure and be able to demonstrate that knowledge.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:

COMPETENCY: *Demonstrate an understanding of special diodes and transistors. (D.05)(Page 1 of 4)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/skills required)
	Occupational Theory					
Tasks:		EIF 02,08,014,015,022				**Resources**: Time: Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others;** **Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/corrects performance; improves;** Technology: Selects/ Applies/maintains
1. Identify the schematic symbols & proper lead placement for the PN diode, the Lener diode, and the LED.			ACT Level 5 SCANS F1-d	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: SAME	
2. Discuss the operating characteristics of the Lener diode & LED.			SAME	SAME	SAME	
3. List the main parameters & electrical characteristics of the PN diode, the Lener diode, and LED.			SAME	SAME	SAME	
4. Discuss the use of LED as level indicators.			SAME	SAME	SAME	
5. Explain the operation of the 7-segment display (common-anode & common-cathode).			SAME	SAME	SAME	
6. List the main parameters & electrical characteristics of the Lener & LED as found on device specification sheets.			SAME	SAME	SAME	
7. Define & calculate the line and load regulation rating of a given voltage regulator.			SAME	SAME	SAME	
			(EIF 056,057,058,059, 060)(Listening 5 EIF 063;Writing 4 EIF 062)	(EIF 070,071,072,074, 075,076,077, 078,081, 084,086,087,089)		

*(Know the technical basis for the workings of a product/device/circuit/procedure and be able to demonstrate that knowledge.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:

COMPETENCY: *Demonstrate an understanding of special diodes and transistors. (D.05)(Page 1 of 3)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/skills required)
	Occupational Theory					
Tasks:		EIF 02,08,014,015,022				**Resources:** Time: Selects goal relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others;** **Leadership:** communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information:** Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/corrects performance; improves;** **Technology:** Selects/ Applies/maintains
8. Define & explain the single regulation rating of a given voltage regulator.			ACT Level 5 SCANS F1-d	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: SAME	
9. Compare the series & shunt regulators.			SAME	SAME	SAME	
10. Explain why the series regulator is preferred over the shunt regulator.			SAME	SAME	SAME	
11. Explain the operation of the IC voltage regulator.			SAME	SAME	SAME	
12. List & define the major parameters & ratings of an IC voltage regulator.			SAME	SAME	SAME	
13. Calculate the maximum allowable input voltage & the value of regulated output voltage for an adjustable IC regulator.			SAME	SAME	SAME	
14. Construct & evaluate discrete voltage regulator circuits & IC regulator circuits.			SAME	SAME	SAME	
			(EIF 056,057,058,059, 060)(Listening 5 EIF 063;Writing 4 EIF 062)	(EIF 070,071,072,074, 075,076,077, 078,081, 084,086,087,089)		

*(Know the technical basis for the workings of a product/device/circuit/procedure and be able to demonstrate that knowledge.)

Occupation: Electronic Technician
Duty Area/Function:

Task Analysis Worksheet

COMPETENCY: *Demonstrate an understanding of special diodes and transistors. (D.05)(Page 2 of 3)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/skills required)
	Occupational Theory					
Tasks:		EIF 02,08,014,015,022				
15. Describe the construction & operation of an uni junction transistor (UJT).			ACT Level 5 SCANS F1-d	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: SAME	**Resources**: Time: Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/corrects performance; improves;** **Technology**: Selects/ Applies/maintains
16. Define intrinsic standoff ratio & negative resistance.			SAME	SAME	SAME	
17. Construct a UJT relaxation oscillator; perform circuit calculations & compare the waveforms at emitter, base 1 & base 2.			SAME	SAME	SAME	
18. Describe the operating characteristics & applications of a varactor diode.			SAME	SAME	SAME	
19. Describe the operation of transient suppressors & their usefulness in electronic circuits.			SAME	SAME	SAME	
20. Compare back-to-back transient suppressors with standard transient suppressors.			SAME	SAME	SAME	
21. Discuss the operation of a constant current diode & its applications as a series current regulator & a shunt current regulator.			SAME	SAME	SAME	
			(EIF 056,057,058,059, 060)(Listening 5 EIF 063;Writing 4 EIF 062)	(EIF 070,071,072,074, 075,076,077, 078,081, 084,086,087,089)		

*(Know the technical basis for the workings of a product/device/circuit/procedure and be able to demonstrate that knowledge.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:

COMPETENCY: *Demonstrate an understanding of special diodes and transistors. (D.05)(Page 3 of 3)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/skills required)
	Occupational Theory					
Tasks:		EIF 02,08,014,015,022				**Resources: Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/corrects performance; improves; Technology:** Selects/ Applies/maintains
22. Describe the operation of the tunnel diode & recognize its I-E characteristic curve.			ACT Level 5 SCANS F1-d	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: SAME	
23. Describe the operation of a tunnel diode oscillator circuit.			SAME	SAME	SAME	
24. Describe the construction & operation of the Schottky diode.			SAME	SAME	SAME	
25. Describe the construction & operation of PIN diode.			SAME	SAME	SAME	
26. Describe the construction & operation of the step-recovery diode.			SAME	SAME	SAME	
27. Identify the schematic symbols of the varactor, transient suppressors, constant-current diode, tunnel diode, Schottky diode, & PIN diode.			SAME	SAME	SAME	
			(EIF 056,057,058,059, 060)(Listening 5 EIF 063;Writing 4 EIF 062)	(EIF 070,071,072,074, 075,076,077, 078,081, 084,086,087,089)		

*(Know the technical basis for the workings of a product/device/circuit/procedure and be able to demonstrate that knowledge.)

Occupation: Electronic Technician
Duty Area/Function:

Task Analysis Worksheet

COMPETENCY: *Understand principles and operations of diode circuits. (D.06)(Page 1 of 2)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/skills required)
	Occupational Theory					
Tasks:		EIF 02,08,014,015,022				**Resources: Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others;** **Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/corrects performance; improves;** **Technology:** Selects/ Applies/maintains
1. Analyze simple PN diode circuits.			ACT Level 5 SCANS F1-d SAME	ACT Level 5 SCANS F3 & F4 SAME	ACT Level 5 SCANS: SAME SAME	
2. Determine the suitability of a given application using specification sheets or selector guides.						
3. Explain the purpose of a power supply & list circuits involved.			SAME	SAME	SAME	
4. Explain operation of: half-wave rectifier, full-wave rectifier, & bridge rectifier.			SAME	SAME	SAME	
5. Calculate peak & DC average output voltage & current for any rectifier circuit.			SAME	SAME	SAME	
6. Discuss the effects that filtering has on a rectifier's output voltage.			SAME	SAME	SAME	
7. Determine the Peak Inverse Voltage (PIV) for a diode in any rectifier circuit.			SAME	SAME	SAME	
			(EIF 056,057,058,059, 060)(Listening 5 EIF 063;Writing 4 EIF 062)	(EIF 070,071,072,074, 075,076,077, 078,081, 084,086,087,089)		

*(Know the technical basis for, and be able to explain how, the product/device/circuit works).

Occupation: Electronic Technician
Duty Area/Function:

Task Analysis Worksheet

COMPETENCY: *Understand principles and operations of diode circuits. (D.06)(Page 2 of 2)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/skills required)
	Occupational Theory					
Tasks:		EIF 02,08,014,015,022				
8. Calculate current & voltage values for a filtered rectifier circuit.			ACT Level 5 SCANS F1-d	ACT Level 5 SCANS F3 & F4	ACT Level 5 SCANS: SAME	**Resources: Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership**:communicates ideas to justify position, persuades/convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/corrects performance; improves;** **Technology:** Selects/ Applies/maintains
9. Describe the basic operations of clippers, clampers, & voltage multifliers & the purposes served by each.			SAME	SAME	SAME	
10. Discuss the use of clippers for transient protection.			SAME	SAME	SAME	
11. Describe the operation of an AM detector diode circuit.			SAME	SAME	SAME	
12. Draw circuit diagrams & their respective input & output waveforms for half wave rectifiers, full wave rectifiers, filtered rectifiers, clippers & clampers.			SAME	SAME	SAME	
			(EIF 056,057,058,059, 060)(Listening 5 EIF 063;Writing 4 EIF 062)	(EIF 070,071,072,074, 075,076,077, 078,081, 084,086,087,089)		

*(Know the technical basis for, and be able to explain how, the product/device/circuit works).

Occupation: Electronic Technician
Duty Area/Function:

Task Analysis Worksheet

COMPETENCY: *Understand principles and operations of optoelectronic circuits (Gate isolators, Interrupt sensors, infra red sensors, etc.) (D.09)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/skills required)
	Occupational Theory					
Tasks: 1. Explain the operation, parameters & ratings of the photodiode.			ACT Level 5 SCANS F1-d	ACT Level 5 SCANS F3 & F4	ACT Level 5 SCANS: SAME	**Resources: Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/corrects performance; improves; Technology: Selects/ Applies/maintains**
2. Describe the operation of a standard photo-transistor & compare it to the Photo-Darlington transistor.			SAME	SAME	SAME	
3. Discuss the operation of the photodector & the LASCR.			SAME	SAME	SAME	
4. Discuss the construction, operation & applications of optoisolators & optointerrupters.			SAME	SAME	SAME	
5. Explain why wavelength is an important concept in electronics & calculate the wavelength (innanometers) of a signal with a given frequency.			SAME	SAME	SAME	
			(EIF 056,057,058,059, 060)(Listening 5 EIF 063;Writing 4 EIF 062)	(EIF 070,071,072,074, 075,076,077, 078,081, 084,086,087,089)		

*(Know the technical basis for, and be able to explain how, the product/device/circuit works).

Occupation: Electronic Technician
Duty Area/Function:

Task Analysis Worksheet

COMPETENCY: *Understand principles and operations of single stage amplifiers. (D.12)(Page 1 of 4)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/skills required)
	Occupational Theory					
Tasks:		EIF 02, 08, 014, 015, 022				**Resources: Time**: Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others;** **Leadership**:communicates ideas to justify position, persuades/convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/corrects performance; improves;** **Technology: Selects/Applies/maintains**
1. State the purpose served by DC biasing circuits.			ACT Level 5 SCANS F1-d	ACT Level 5 SCANS F3 & F4	ACT Level 5 SCANS: SAME	
2. Plot the DC load line & Q-point for a given amplifier.			SAME	SAME	SAME	
3. Recognize base bias and calculate circuit values.			SAME	SAME	SAME	
4. Determine laid-point bias & explain Q-point shift.			SAME	SAME	SAME	
5. Recognize emitter-bias & calculate circuit values.			SAME	SAME	SAME	
6. Recognize voltage-divider bias & calculate circuit values.			SAME	SAME	SAME	
7. Describe construction & current characteristics of collector-feedback & emitter-feedback bias.			SAME	SAME	SAME	
			(EIF 056,057,058,059, 060)(Listening 5 EIF 063;Writing 4 EIF 062)	(EIF 070,071,072,074, 075,076,077, 078,081, 084,086,087,089)		

*(Know the technical basis for, and be able to explain how, the product/device/circuit works).

Occupation: Electronic Technician
Duty Area/Function:

Task Analysis Worksheet

COMPETENCY: *Understand principles and operations of single stage amplifiers. (D.12)(Page 2 of 4)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/skills required)
	Occupational Theory					
Tasks: 8. Describe voltage gain, current gain, & power gain of each transistor configuration.		EIF 02, 08, 014, 015, 022	ACT Level 5 SCANS F1-d	ACT Level 5 SCANS F3 & F4	ACT Level 5 SCANS: SAME	**Resources:** Time: Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/corrects performance; improves; Technology:** **Selects/ Applies/maintains**
9. Calculate AC emitter resistance.			SAME	SAME	SAME	
10. Discuss the roles of coupling capacitors & bypass capacitors in amplifiers.			SAME	SAME	SAME	
11. Derive the AC equivalent circuit for any given amplifier.			SAME	SAME	SAME	
12. Calculate voltage gain, output power, & impedances for any given amplifier.			SAME	SAME	SAME	
13. Explain the effects of loading & swamping on amplifier gain & stability.			SAME	SAME	SAME	
14. Perform circuit calculations using H parameters.			SAME (EIF 056,057,058,059, 060)(Listening 5 EIF 063;Writing 4 EIF 062)	SAME (EIF 070,071,072,074, 075,076,077, 078,081, 084,086,087,089)	SAME	

*(Know the technical basis for, and be able to explain how, the product/device/circuit works).

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:

COMPETENCY: *Understand principles and operations of single stage amplifiers. (D.12)(Page 3 of 4)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/skills required)
	Occupational Theory					
Tasks:		EIF 02, 08, 014, 015, 022				**Resources:** **Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others;** **Leadership:**communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information:** Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/corrects performance; improves;** **Technology:** **Selects/ Applies/maintains**
15. Identify Class A, AB, B, & C amplifiers.			ACT Level 5 SCANS F1-d	ACT Level 5 SCANS F3 & F4	ACT Level 5 SCANS: SAME	
16. Compare RC coupled & transformer coupled class A amplifiers.			SAME	SAME	SAME	
17. Calculate amplifier compliance, source power, load power, & efficiency for RC & FMR coupled class A amplifiers.			SAME	SAME	SAME	
18. Describe the operating characteristics of Class B, Class AB complementary & push-pull amplifiers.			SAME	SAME	SAME	
19. Calculate load power, source power, and efficiency for two transistor Class B & Class AB amplifiers.			SAME	SAME	SAME	
20. Discuss the relationship between frequency bandwidth & amplifier gain.			SAME	SAME	SAME	
21. Calculate and measure bandwidth.			SAME (EIF 056,057,058,059, 060)(Listening 5 EIF 063;Writing 4 EIF 062)	SAME (EIF 070,071,072,074, 075,076,077, 078,081, 084,086,087,089)	SAME	

*(Know the technical basis for, and be able to explain how, the product/device/circuit works).

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:

COMPETENCY: *Understand principles and operations of single stage amplifiers. (D.12)(Page 4 of 4)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/skills required)
	Occupational Theory					
Tasks:		EIF 02, 08, 014, 015, 022				**Resources: Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership:**communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information:** Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/corrects performance; improves; Technology: Selects/ Applies/maintains**
22. Draw a bode plot.			ACT Level 5 SCANS F1-d	ACT Level 5 SCANS F3 & F4	ACT Level 5 SCANS: SAME	
23. Discuss the relationship between the roll off rate & the bandwidth of a tuned amplifier.			SAME	SAME	SAME	
24. Calculate Q, BW, and center frequency.			SAME	SAME	SAME	
25. Describe the circuit operation of a Discrete tuned amplifier.			SAME	SAME	SAME	
26. Discuss the procedures for tuning an amplifier.			SAME	SAME	SAME	
27. Describe the circuit operation of a Class C amplifier.			SAME	SAME	SAME	
28. Compare JFETs and BJTs in terms of construction, operating principles & applications as amplifiers.			SAME (EIF 056,057,058,059, 060)(Listening 5 EIF 063;Writing 4 EIF 062)	SAME (EIF 070,071,072,074, 075,076,077, 078,081, 084,086,087,089)	SAME	

*(Know the technical basis for, and be able to explain how, the product/device/circuit works).

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:

COMPETENCY: *Understand principles and operations of thyristor circuitry (SCR, TRIAC, DIAC, etc.) (D.15)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/skills required)
	Occupational Theory					
Tasks:						**Resources**: Time: Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others;** **Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/corrects performance; improves;** **Technology**: Selects/ Applies/maintains
1. Define thyristor; list those most widely used & identify their schematic symbols.			ACT Level 5 SCANS F1-d	ACT Level 5 SCANS F3 & F4	ACT Level 5 SCANS: SAME	
2. Describe the construction & operation of silicon unilateral switch (SUS) and silicon-controlled rectifier (SCR).			SAME	SAME	SAME	
3. List & define the primary parameters & ratings of the SUS & SCR.			SAME	SAME	SAME	
4. Calculate surge current limits for SCR circuit.			SAME	SAME	SAME	
5. Define false triggering in SCR circuits & describe methods used to prevent it.			SAME	SAME	SAME	
6. Describe operation & function of SCR crowbar circuit, SCR phase controller, & SCR motorspeed controller.			SAME	SAME	SAME	
7. Describe construction, operation & applications of the SBS, GTO & SIDAC.			SAME (EIF 056,057,058,059, 060)(Listening 5 EIF 063;Writing 4 EIF 062)	SAME (EIF 070,071,072,074, 075,076,077, 078,081, 084,086,087,089)	SAME	

*(Know the technical basis for, and be able to explain how, the product/device/circuit works).

Analog Circuits

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Occupation: Electronic Technician
Duty Area/Function:

Task Analysis Worksheet

COMPETENCY: *Understand principles and operations of multistage amplifiers (E.01)(Page 1 of 2)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/skills required)
	Occupational Theory					
Tasks:		1. Function Generator 2. DMM 3. Scope 4. Proto Board 5. Components 6. Hook-up wire				**Resources**: Time: Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility**: Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity**: works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/corrects performance; improves; Technology: Selects/ Applies/maintains**
1. Analyze the frequency spectrum and where the audio range fits into the spectrum.			ACT Level 4 SCANS F1-b	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: SAME	
2. Distinguish between voltage and power amplifiers and the various types of devices used in these circuits.			SAME	SAME	SAME	
3. Differentiate between the different classes of amplifiers (A, AB, B) and the biasing arrangements for each type.			SAME	SAME	SAME	
4. Explain the functions of the transducers (microphones, earphones & loudspeakers) used in audio amplifiers.			SAME	SAME	SAME	
5. Identify the methods of coupling and impedance matching employed in audio amplifiers.			SAME	SAME	SAME	
6. Recognize single-ended, push-pull & complementary symmetry audio amplifier circuits and their characteristics.			SAME	SAME	SAME	

*(Know the technical basis for, and be able to explain how, the product/device/circuit works).

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Occupation: Electronic Technician
Duty Area/Function:

Task Analysis Worksheet

COMPETENCY: *Understand principles and operations of multistage amplifiers (E.01)(Page 2 of 2)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/skills required)
	Occupational Theory					
Tasks: 7. Analyze the use of inverse feedback for linearity control & the different methods employed in volume & tone control.		1. Function Generator 2. DMM 3. Scope 4. Proto Board 5. Components 6. Hook-up wire	ACT Level 4 SCANS F1-b	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: SAME	**Resources: Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others;** **Leadership:**communicates ideas to justify position, persuades/convinces;responsibly challenges; **Works with Diversity:** works with others; **Information:** Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/corrects performance; improves;** **Technology:** Selects/ **Applies/maintains**
8. Measure the effects of some typical transistors, operational amplifiers, and active bandpass filter circuits.			SAME	SAME	SAME	

*(Know the technical basis for, and be able to explain how, the product/device/circuit works).

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:

COMPETENCY: *Understand principles and operations of RF/IF circuits. (E.04)(Page 1 of 2)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/skills required)
	Occupational Theory					
Tasks: 1. Select the proper RF amplifier for a specific application using the frequency voltage & power requirements.		1. Function Generator 2. DMM 3. Scope 4. Proto Board 5. Components 6. Hook-up wire	ACT Level 4 SCANS F1-b	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: SAME	**Resources:** Time: Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others;** **Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems;monitors/ corrects performance; improves;** **Technology:** Selects/ **Applies/maintains**
2. Define the requirements, advantages & disadvantages of the different biasing arrangements of RF amplifiers.			SAME	SAME	SAME	
3. List the different methods of coupling between RF stages & the advantages, disadvantages & limitations of each.			SAME	SAME	SAME	
4. Recognize single-ended, parallel & push-pull operations and how to tune the output circuits of each configuration.			SAME	SAME	SAME	
5. Analyze the requirements for & the different methods of neutralizing RF amplifiers.			SAME	SAME	SAME	
6. Identify the characteristics of and requirements for frequency multiplier circuits in RF amplifier applications.			SAME	SAME	SAME	

*(Know the technical basis for, and be able to explain how, the product/device/circuit works).

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:

COMPETENCY: *Understand principles and operations of RF/IF circuits. (E.04)(Page 2 of 2)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/skills required)
	Occupational Theory					
Tasks:		1. Function Generator 2. DMM 3. Scope 4. Proto Board 5. Components 6. Hook-up wire				**Resources**: Time: Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems;monitors/ corrects performance; improves; Technology: Selects/ Applies/maintains**
7. Review the method for determining values of L and C for resonant circuits.			ACT Level 4 SCANS F1-b	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: SAME	
8. Explain the advantages of grounded grid (base gate) RF amplifiers and Pi-network outputs.			SAME	SAME	SAME	
9. Analyze the special characteristics of UHF and VHF amplifiers.			SAME	SAME	SAME	
10. Examine transistor RF amplifiers and Pi-network output networks.			SAME	SAME	SAME	

*(Know the technical basis for, and be able to explain how, the product/device/circuit works).

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:

COMPETENCY: *Understand principles and operations of linear power supplies and filters. (E.07)(Page 1 of 3)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/skills required)
	Occupational Theory					
Tasks:		1. A.C. Source 2. DMM 3. Scope 4. Proto Board 5. Diodes & other components 6. Hook-up wire				**Resources:** Time: Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others;** **Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems;monitors/ corrects performance; improves;** **Technology:** Selects/ **Applies/maintains**
1. Explain the purpose of a power supply & list the circuits involved.			ACT Level 4 SCANS F1 b	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: SAME	
2. Explain the operation of the half-wave rectifier, the full-wave rectifier & the bridge rectifier.			SAME	SAME	SAME	
3. Calculate the peak and dc average output voltage and current for any rectifier circuit.			SAME	SAME	SAME	
4. Discuss the effects that filtering has on a rectifier circuit.			SAME	SAME	SAME	
5. Determine the PIV for a diode in any rectifier circuit.			SAME	SAME	SAME	
6. Calculate the current & voltage values for a filtered rectifier circuit.			SAME	SAME	SAME	
7. Explain the operation of a shunt zener regulator & calculate the values of its voltages & currents.			SAME	SAME	SAME	

*(Know the technical basis for, and be able to explain how, the product/device/circuit works).

Occupation: Electronic Technician
Duty Area/Function:

Task Analysis Worksheet

COMPETENCY: *Understand principles and operations of linear power supplies and filters. (E.07)(Page 2 of 3)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/skills required)
	Occupational Theory					
Tasks:						
8. State the basic operation of clippers, clampers, & voltage multipliers & the purposes served by each.		1. A.C. Source 2. DMM 3. Scope 4. Proto Board 5. Diodes & other components 6. Hook-up wire	ACT Level 4 SCANS F1-b	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: SAME	**Resources**: Time: Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works** [illegible] **Diversity:** works [illegible]: Acquires, [illegible] organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems;monitors/ corrects performance; improves;** **Technology:** Selects/ **Applies/maintains**
9. Discuss the use of clippers for transient protection.			SAME	SAME	SAME	
10. Describe the operation of an AM diode detector circuit.			SAME	SAME	SAME	
11. Discuss the use of LEDs as level indicators.			SAME	SAME	SAME	
12. Explain the operation of the 7-segment display, the common-cathode display and the common anode display.			SAME	SAME	SAME	
13. Recognize clipper, clamper and multiplier circuits.			SAME	SAME	SAME	
14. Draw circuit diagrams & their respective input & output waveforms for half-wave, full-wave, filtered rectifiers, clippers, and clampers.			SAME	SAME	SAME	

*(Know the technical basis for, and be able to explain how, the product/device/circuit works).

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Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:

COMPETENCY: *Understand principles and operations of linear power supplies and filters. (E.07)(Page 3 of 3)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, infor mation, interpersonal and systems competencies/skills required)
	Occupational Theory					
Tasks: 15. Define & calculate the line regulation rating of a given voltage regulator.		1. A.C. Source 2. DMM 3. Scope 4. Proto Board 5. Diodes & other components 6. Hook-up wire	ACT Level 4 SCANS F1-b	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: SAME	**Resources: Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems;monitors/ corrects performance; improves; Technology: Selects/ Applies/maintains**
16. Define & calculate the load regulation rating of a given voltage regulator.			SAME	SAME	SAME	
17. Define & explain the single regulation rating of a given voltage regulator.			SAME	SAME	SAME	
18. Compare & contrast the series regulator & the shunt regulator.			SAME	SAME	SAME	
19. Explain why the series regulator is preferred over the shunt regulator.			SAME	SAME	SAME	
20. Explain the operation of the IC voltage regulator.			SAME	SAME	SAME	
21. List & define the major parameters & ratings of an IC voltage regulator.			SAME	SAME	SAME	
22. Calculate the maximum allowable input voltage & the value of regulated output voltage for an adjustable IC regulator.			SAME	SAME	SAME	

*(Know the technical basis for, and be able to explain how, the product/device/circuit works).

Occupation: Electronic Technician
Duty Area/Function:

Task Analysis Worksheet

COMPETENCY: *Understand principles and operations of operational amplifier circuits. (E.10)(Page 1 of 2)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/skills required)
	Occupational Theory					
Tasks: 1. The operational amplifier: a. Interpret a typical operational amplifier data sheet; b. Measure common operational amplifier parameters; c. Identify input & feedback elements & calculate the effects of feedback on the circuit. 2. Basic linear amplifier circuits: Predict the performances of, & demonstrate an understanding of the operation of the: 1) voltage follower; 2) non-inverting amplifier; 3) inverting amplifier; 4) 2-input summing amplifier; 5) difference amplifier. 3. The differentiator & integrator: Predict the performances of, and demonstrate an understanding of the operation of the: 1) differentiator; 2) integrator.		1. Function Generator 2. DMM 3. Scope 4. Proto Board 5. Diodes & other components 6. Hook-up wire	ACT Level 4 SCANS F1-b SAME SAME SAME SAME SAME	ACT Level 6 SCANS F3 & F4 SAME SAME SAME SAME SAME	ACT Level 5 SCANS: SAME SAME SAME SAME SAME SAME	**Resources**: Time: Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems;monitors/ corrects performance; improves;** **Technology**: Selects/ Applies/maintains

*(Know the technical basis for, and be able to explain how, the product/device/circuit works).

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Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:

COMPETENCY: *Understand principles and operations of operational amplifier circuits. (E.10)(Page 2 of 2)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/skills required)
	Occupational Theory					
Tasks: 4. Non linear signal processing circuits: Predict the performance of, & demonstrate an understanding of the operation of the: 1) non-inverting comparator; 2) sine-to-square wave converter; 3) window comparator; 4) precision half-wave & full-wave rectifier.		1. Function Generator 2. DMM 3. Scope 4. Proto Board 5. Diodes & other components 6. Hook-up wire	ACT Level 4 SCANS F1-b	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: SAME	**Resources: Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal: Team:** Participates as team; **teaches others; Leadership:** communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information:** Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems;monitors/ corrects performance; improves; Technology: Selects/ Applies/maintains**
5. Generators: - Predict the performance of, & demonstrate an understanding of the operation of the: 1) Wien-bridge sine-wave oscillator; 2) square wave oscillator; 3) combination square & triangle wave generator.			SAME SAME	SAME SAME	SAME SAME	
6. The Norton Op-amp: a. Predict & demonstrate the effect of varying the bias of the Norton op-amp; b. Predict the performances of, & demonstrate an understanding of the operation of the Norton op-amp circuits: 1) non-inverting AC & inverting AC amplifier; 2) voltage controlled oscillator.			SAME	SAME	SAME	

*(Know the technical basis for, and be able to explain how, the product/device/circuit works).

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:

COMPETENCY: *Understand principles and operations of audio power amplifiers. (E.13)(Page 1 of 2)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/skills required)
	Occupational Theory					
Tasks:		1. Function Generator 2. DMM 3. Scope 4. Proto Board 5. Components 6. Hook-up wire				**Resources**: Time: Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility**: Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/corrects performance; improves; Technology:** Selects/ Applies/maintains
1. Analyze the frequency spectrum and where the audio range fits into the spectrum.			ACT Level 4 SCANS F1-b	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: SAME	
2. Distinguish between voltage and power amplifiers and the various types of devices used in these circuits.			SAME	SAME	SAME	
3. Differentiate between the different classes of amplifiers (A, AB, B) and the biasing arrangements for each type.			SAME	SAME	SAME	
4. Explain the functions of the transducers (microphones, earphones & loudspeakers) used in audio amplifiers.			SAME	SAME	SAME	
5. Identify the methods of coupling and impedance matching employed in audio amplifiers.			SAME	SAME	SAME	
6. Recognize single-ended, push-pull & complementary symmetry audio amplifier circuits and their characteristics.			SAME	SAME	SAME	

*(Know the technical basis for, and be able to explain how, the product/device/circuit works).

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:

COMPETENCY: *Understand principles and operations of audio power amplifiers. (E.13)(Page 2 of 2)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/skills required)
	Occupational Theory					
Tasks: 7. Analyze the use of inverse feedback for linearity control & the different methods employed in volume & tone control. 8. Measure the effects of some typical transistors, operational amplifiers, and active bandpass filter circuits.		1. Function Generator 2. DMM 3. Scope 4. Proto Board 5. Components 6. Hook-up wire	ACT Level 4 SCANS F1-b SAME	ACT Level 6 SCANS F3 & F4 SAME	ACT Level 5 SCANS: SAME SAME	Resources: Time: Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others;** **Leadership:**communicates ideas to justify position, persuades/convinces;responsibly challenges; **Works with Diversity:** works with others; **Information:** Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/corrects performance; improves;** Technology: **Selects/Applies/maintains**

*(Know the technical basis for, and be able to explain how, the product/device/circuit works).

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Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:
COMPETENCY: *Understand principles and operations of regulated and switching power supply circuits. (E.16)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/skills required)
	Occupational Theory					
Tasks: 1. Describe & analyze the FJT switch.		1. Function Generator 2. DMM 3. Scope 4. Proto Board 5. Parts kit	ACT Level 4 SCANS F1-b	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: SAME	**Resources. Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership:**communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/corrects performance; improves; Technology:** Selects/ Applies/maintains
2. Describe & analyze the operation of the JFET switch & the MOSFET switch.			SAME	SAME	SAME	
3. Describe & calculate pulse width, duty cycle & propagation delay.			SAME	SAME	SAME	
4. Compare & contrast the free-running multivibrator, the one-shot & the bistable multivibrator.			SAME	SAME	SAME	
5. Describe the 555 timer, its internal operation & its primary applications.			SAME	SAME	SAME	
6. Describe the operation of the monostable (one-shot) multivibrator.			SAME	SAME	SAME	
7. Describe the operation of the astable (free-running) multivibrator.			SAME	SAME	SAME	

*(Know the technical basis for, and be able to explain how, the product/device/circuit works).

Occupation: Electronic Technician
Duty Area/Function:

Task Analysis Worksheet

COMPETENCY: *Understand principles and operations active filter circuits. (E.19)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/skills required)
	Occupational Theory					
Tasks: 1. Review conventional filters made from passive devices: a. Low pass (1) RC (2) RL b. Hi pass (1) RC (2) RL c. Band pass RLC d. Band Block or Stop RLC e. M derived f. Constant K		1. Assorted Components 2. DMM 3. Scope 4. Proto Board 5. Parts kit	ACT Level 4 SCANS F1 b	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: SAME	**Resources**: Time: Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others;** **Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/corrects performance; improves;** **Technology**: Selects/ Applies/maintains
2. Low pass Active filter using op amp & RC network: a. Single pole (firstorder) b. db/decade roll-off c. Two pole (second order) (butterworth) d. db/decade roll-off			SAME	SAME	SAME	
3. Hi-pass active filter using op-amp & RC networks: a. Single Pole b. db/decade roll-off c. Tow pole (butterworth) d. db/decade roll-off			SAME	SAME	SAME	
4. Band Pass using combination hi-pass/low pass			SAME	SAME	SAME	

*(Know the technical basis for, and be able to explain how, the product/device/circuit works).

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:

COMPETENCY: *Understand principles and operations of sinusoidal and non sinusoidal oscillator circuits. (E.22)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/skills required)
	Occupational Theory					
Tasks:		1. Assorted Components 2. DMM 3. Scope 4. Proto Board 5. Parts kit				**Resources**: Time: Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility**: Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity**: works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/corrects performance; improves;** **Technology**: Selects/ Applies/maintains
1. List and explain the requirements for proper operation of an oscillator.			ACT Level 4 SCANS F1-b	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: SAME	
2. Describe the construction & operation of the phase-shift oscillator.			SAME	SAME	SAME	
3. Explain how a multistage discrete amplifier can go into oscillation & how to prevent it.			SAME	SAME	SAME	
4. Describe the construction & operation of a Colpitts oscillator.			SAME	SAME	SAME	
5. Describe the construction & operation of a Clapp oscillator.			SAME	SAME	SAME	
6. Describe the construction & operation of a Hartley oscillator.			SAME	SAME	SAME	
7. Describe the construction & operation of an Armstrong oscillator.			SAME	SAME	SAME	
8. Compare the crystal-controlled oscillator with other types of LC oscillators.			SAME	SAME	SAME	
9. Determine if a given oscillator circuit fulfills the Barkhausen criterion by performing circuit calculations.			SAME	SAME	SAME	

*(Know the technical basis for, and be able to explain how, the product/device/circuit works).

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:

COMPETENCY: *Understand principles and operations of fiber optic circuits using photodiodes or LASERS. (E.25)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/skills required)
	Occupational Theory					
Tasks:		1. TDR 2. Splicer 3. Scope 4. Glass Fibers 5. TXMIT & Rectifier system				**Resources:** Time: Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires, stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership:** communicates ideas to justify position, persuades/ convinces; responsibly challenges; **Works with Diversity:** works with others; **Information:** Acquires, evaluates, organizes, maintains, interprets, communicates information; uses computer to process information **Systems: understands systems; monitors/corrects performance; improves; Technology:** Selects/ Applies/maintains
1. Demonstrate a fundamental understanding of fiber optics.			ACT Level 4 SCANS F1-b	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: SAME	
2. Demonstrate an understanding of the applications of fiber optics in electronics.			SAME	SAME	SAME	
3. Explain refractive index & higher order modes.			SAME	SAME	SAME	
4. Explain the characteristics of the fiber optics & signal components.			SAME	SAME	SAME	
5. Explain the physics of light generation.			SAME	SAME	SAME	
6. Explain the characteristics of the laser diode & light emitting diode.			SAME	SAME	SAME	
7. Explain the principle of optoelectronic transducers.			SAME	SAME	SAME	
8. Explain the function of the essential components of any fiber optic system.			SAME	SAME	SAME	
9. Explain the characteristics of couplers and connectors.			SAME	SAME	SAME	

*(Know the technical basis for, and be able to explain how, the product/device/circuit works).

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:

COMPETENCY: *Understand principles and operations of signal modulation systems (AM, FM, stereo) (E.28)(Page 1 of 4)

Technology	Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/skills required)
Occupational Theory					
Tasks: 1. Define modulation & list the reasons for modulating an RF carrier.	1. TDR 2. Splicer 3. Scope with demo probe 4. Glass Fibers 5. Mod Meter 6. Function Generator 7. Trans & op-amps 8. Circuits components	ACT Level 4 SCANS F1-b	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: SAME	**Resources**: Time: Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/corrects performance; improves;** **Technology:** Selects/ **Applies/maintains**
2. Explain the relationship between sound waves & the human ear & how the waves can be converted to electrical impulses & used to modulate an RF Carrier.		SAME	SAME	SAME	
3. Analyze the modulation process, Absorption Modulation, Series & Plate modulation, formation of the modulation envelope, & determination of percent of modulation.		SAME	SAME	SAME	
4. Evaluate plate modulation of the different types of vacuum tubes & how it affects operating power.		SAME	SAME	SAME	
5. Examine the effects of modulation on sideband generation & bandwidth.		SAME	SAME	SAME	
6. Identify the different types of modulation & classify them as High or Low level.		SAME	SAME	SAME	
7. Evaluate the other types of modulation to include Heising & the three types of Grid (control, screen & suppressor) modulation.					

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Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:

COMPETENCY: *Understand principles and operations of signal modulation systems (AM, FM, stereo) (E.28)(Page 2 of 4)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/skills required)
	Occupational Theory					
Tasks: 8. Calculate the percent of modulation using an oscilloscope.		1. TDR 2. Splicer 3. Scope with demo probe 4. Glass Fibers 5. Mod Meter 6. Function Generator 7. Trans & op-amps 8. Circuits components	ACT Level 4 SCANS F1-b	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: SAME	Resources: Time: Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others;** **Leadership:**communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information:** Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/corrects performance; improves;** Technology: Selects/ Applies/maintains
9. Evaluate the components of an AM modulated radio signal.			SAME	SAME	SAME	
10. Analyze the procedures for detection & demodulation of an AM modulated wave.			SAME	SAME	SAME	
11. Describe the characteristics of & the differences between TRF. Superregenerative & Superheterodyne receivers.			SAME	SAME	SAME	
12. Identify & compare the operational characteristics of RF, IF, and AF amplifiers.			SAME	SAME	SAME	
13. Explain the relationship between the number of RF & IF amplifiers & the S/N ratio of receivers.			SAME	SAME	SAME	
14. Determine how automatic volume control (AVC) voltages are generated through AM Detection circuits.			SAME	SAME	SAME	

*(Know the technical basis for, and be able to explain how, the product/device/circuit works).

Occupation: Electronic Technician
Duty Area/Function:

Task Analysis Worksheet

COMPETENCY: *Understand principles and operations of signal modulation systems (AM, FM, stereo) (E.28)(Page 3 of 4)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/skills required)
	Occupational Theory					
Tasks: 15. Determine how automatic gain control (AGC) voltages are developed from CW & SSB demodulation.		1. Rf Gen with AM & FM capabilities 2. Splicer 3. Scope with demo probe 4. Glass Fibers 5. Mod Meter 6. Function Generator 7. Trans & op-amps 8. Circuits components	ACT Level 4 SCANS F1-b	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: SAME	**Resources: Time:** Selects goal relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership:**communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information:** Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/corrects performance; improves;** **Technology: Selects/ Applies/maintains**
16. Analyze the make-up of image frequencies, their affects on received signals, & how they can be eliminated through use of wave traps & filters.			SAME	SAME	SAME	
17. Explore the advantages of using double conversion superheterodyne receivers.			SAME	SAME	SAME	
18. Evaluate diversity reception (both frequency & space) to minimize selective facing.			SAME	SAME	SAME	
19. Practice the alignment procedures for AM receivers.			SAME	SAME	SAME	
20. Define frequency modulation (FM) & discuss the five major applications of FM.			SAME	SAME	SAME	

*(Know the technical basis for, and be able to explain how, the product/device/circuit works).

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:
COMPETENCY: *Understand principles and operations of signal modulation systems (AM, FM, stereo) (E.28)(Page 4 of 4)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, infor mation, interpersonal and systems competencies/skills required)
	Occupational Theory					
Tasks: 21. Analyze the basic concepts of frequency modulation.		1. TDR 2. Splicer 3. Scope with demo probe 4. Glass Fibers 5. Mod Meter 6. Function Generator 7. Trans & op-amps 8. Circuits components	ACT Level 4 SCANS F1-b	ACT Level 6 SCANS F3 & F4	ACT Level 5 SCANS: SAME	**Resources: Time:** Selects goal relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/Facility:** Acquires,stores, uses materials efficiently; **Interpersonal: Team:** Participates as team; **teaches others; Leadership:**communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/corrects performance; improves; Technology: Selects/ Applies/maintains**
22. List the main concepts of slope and phase-locked-loop detection.			SAME	SAME	SAME	
23. Describe the mechanics & applications of discriminators & detectors in FM demodulation.			SAME	SAME	SAME	
24. Explore the effects & requirements of FM IF limiter circuits.			SAME	SAME	SAME	
25. Analyze the application of pre-emphasis & de-emphasis, & squelch circuits in FM modulation & demodulation.			SAME	SAME	SAME	
26. Practice the proper procedures for aligning FM receivers.			SAME	SAME	SAME	
27. Accomplish FM using a varactor diode circuit.			SAME	SAME	SAME	
28. Produce FM by the direct & indirect methods.			SAME	SAME	SAME	
29. Describe phase modulation techniques & how voice is used to accomplish PM.			SAME	SAME	SAME	

*(Know the technical basis for, and be able to explain how, the product/device/circuit works).

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:

COMPETENCY: *Demonstrate an understanding of motor phase shift control circuits (E.31)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, inter personal and systems competencies/ skills required)
	Occupational Theory					
Tasks: This is beyond the scope of currently taught communications courses in community college courses. It is usually taught as part of radar or robotics courses.						

*(Know the technical basis for the workings of a product/device/circuit/procedure and be able to demonstrate that knowledge.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:

COMPETENCY: *Demonstrate an understanding of cathode ray tubes. (E.32)(Page 1 of 2)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
	Occupational Theory					
Tasks: 1. Understand CRT components & application of each: a. Heater b. Cathode c. Grid d. Intensity control e. Focusing Anode & control f. Acceleration Anode g. Vertical deflection plates h. Horizontal deflection plates i. Aquadag coating j. power supply k. Vertical AMPS l. Horizontal AMPS & sweep generator m. A.C. & D.C. input functions n. XI - X10 Probes		Oscilloscope Function Generator Asst. Capacitors, coils, & resistors	ACT Level 4 SCANS F1-b	ACT Level 5 SCANS F3 & F4	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	Resources: Time: Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/ Facility:** Acquires, stores, uses materials efficiently; **Interpersonal:** Team: Participates as team; **teaches others; Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems;monitors/ corrects performance; improves;Technology: Selects/Applies/maintains**

*(Know the technical basis for the workings of a product/device/circuit/procedure and be able to demonstrate that knowledge.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:

COMPETENCY: *Demonstrate an understanding of cathode ray tubes. (E.32)(Page 2 of 2)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
	Occupational Theory					
Tasks: 2. Free running O'scope: a. Frequency measure b. Phase measure c. Lisstons pattern		Oscilloscope Function Generator Asst. Capacitors, coils, & resistors	ACT Level 4 SCANS F1-b	ACT Level 5 SCANS F3 & F4	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	**Resources**: **Time**: Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/ Facility**: Acquires, stores, uses materials efficiently, **Interpersonal**:**Team**: Participates as team; **teaches others; Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity**: works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems;monitors/ corrects performance; improves;Technology: Selects/Applies/maintains**
3. Triggered Scope a. Time b. generator operation b. Frequency measurement using time B. generator			SAME	SAME	SAME	
4. Spectrum Analyzers Spacing of carrier, sideband, harmonics in frequency spectrum			SAME	SAME	SAME	

*(Know the technical basis for the workings of a product/device/circuit/procedure and be able to demonstrate that knowledge.)

DIGITAL CIRCUITS

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Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:

COMPETENCY: *Demonstrate an understanding of the characteristics of integrated circuit (1C) logic families (F.01)(Page 1 of 2)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
	Occupational Theory					
Tasks:			ACT Level 5 SCANS F1-D	ACT Level 4 SCANS F3	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	**Resources: Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/ Facility:** Acquires, stores, uses materials efficiently; **Interpersonal:** Team: Participates as team; **teaches others; Leadership:** communicates ideas to justify position, persuades/ convinces; responsibly challenges; **Works with Diversity:** works with others; **Information:** Acquires, evaluates, organizes, maintains, interprets, communicates information; uses computer to process information **Systems: understands systems; monitors/ corrects performance; improves; Technology: Selects/Applies/maintains**
			SAME	SAME	SAME	
			SAME	SAME	SAME	

*(Know the technical basis for the workings of a product/device/circuit/procedure and be able to demonstrate that knowledge.)

Occupation: Electronic Technician
Duty Area/Function:

Task Analysis Worksheet

COMPETENCY: *Demonstrate an understanding of the characteristics of integrated circuit (1C) logic families (F.01)(Page 2 of 2)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
	Occupational Theory					
Tasks: 9. Name at least 3 distinct families of digital IC's & identify the 3 most popular & widely used types.			ACT Level 5 SCANS F1-D	ACT Level 4 SCANS F3	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	**Resources: Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/ Facility:** Acquires, stores, uses materials efficiently; **Interpersonal:Team:** Participates as team; **teaches others; Leadership:**communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information:** Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems;monitors/ corrects performance; improves;Technology: Selects/Applies/maintains**
10. Describe the detailed operation & capabilities of TTL, ECL, & CMOS integrated circuits given a schematic diagram of the circuit.			SAME	SAME	SAME	
			SAME	SAME	SAME	

*(Know the technical basis for the workings of a product/device/circuit/procedure and be able to demonstrate that knowledge.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:

COMPETENCY: *Demonstrate an understanding of minimizing logic circuits using Boolean operations. (F.02)(Page 1 of 2)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
	Occupational Theory					
Tasks: 1. Define Boolean Algebra.			ACT Level 5 SCANS F1-D	ACT Level 4 SCANS F3	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	**Resources: Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/ Facility:** Acquires, stores, uses materials efficiently; **Interpersonal: Team:** Participates as team; **teaches others; Leadership:** communicates ideas to justify position, persuades/ convinces; responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information; uses computer to process information **Systems: understands systems; monitors/ corrects performance; improves; Technology: Selects/Applies/maintains**
2. Write the Boolean expression corresponding to a given logic circuit.			SAME	SAME	SAME	
3. Draw the symbolic logic circuit implementing or corresponding to a given Boolean expression.			SAME	SAME	SAME	
4. Write the Boolean expression corresponding to a given truth table.			SAME	SAME	SAME	
5. Develop a truth table corresponding to a given Boolean expression.			SAME	SAME	SAME	
6. Give an example of each of the two basic types of Boolean expressions.			SAME	SAME	SAME	
7. Minimize a given logic expression using the various roles of Boolean algebra.			SAME	SAME	SAME	
8. Implement a given Boolean expression with either NAND or NOR gates.			SAME	SAME	SAME	

*(Know the technical basis for the workings of a product/device/circuit/procedure and be able to demonstrate that knowledge.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:

COMPETENCY: ***Demonstrate an understanding of minimizing logic circuits using Boolean operations.** (F.02)(Page 2 of 2)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
	Occupational Theory					
Tasks:						**Resources**: Time: Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/ Facility:** Acquires, stores, uses materials efficiently; **Interpersonal**:Team: Participates as team; **teaches others; Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems;monitors/ corrects performance; improves;Technology: Selects/Applies/maintains**
9. Write the two versions of DeMorgan's theorem.			ACT Level 5 SCANS F1-D	ACT Level 4 SCANS F3	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	
10. Write the Boolean expression of logic circuits using the wired OR connection.			SAME	SAME	SAME	
11. Properly connect the inputs & outputs of TTL & CMOS logic gates in typical applications.			SAME	SAME	SAME	
12. Simplify sum-of-product expressions using Boolean Theorem.			SAME	SAME	SAME	
13. Simplify sum-of-product expressions using Karnaugh Maps.			SAME	SAME	SAME	
14. Write Boolean equations for combinational functions.			SAME	SAME	SAME	
			(EIF 056, 058, 059) (Listening 5 EIF 063; Writing 4 EIF 062)	EIF 068, 072, 073	EIF 076, 077, 078, 047, 044	

*(Know the technical basis for the workings of a product/device/circuit/procedure and be able to demonstrate that knowledge.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:

COMPETENCY: *Understand principles and operations of linear integrated circuits. (F.03)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
	Occupational Theory					
Tasks: 1. Define & explain the operation of analog-to-digital (A/D) converters. 2. Define & explain the operation of digital-to-analog (D/A) converters.			ACT Level 5 SCANS F1-D SAME (EIF 056, 058, 059) (Listening 5 EIF 063; Writing 4 EIF 062)	ACT Level 4 SCANS F3 SAME EIF 068, 072, 073	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All SAME EIF 076, 077, 078, 047, 044	**Resources: Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/ Facility:** Acquires, stores, uses materials efficiently; **Interpersonal:** Team: Participates as team; **teaches others; Leadership:** communicates ideas to justify position, persuades/ convinces; responsibly challenges; **Works with Diversity:** works with others; **Information:** Acquires, evaluates, organizes, maintains, interprets, communicates information; uses computer to process information **Systems: understands systems; monitors/ corrects performance; improves; Technology: Selects/Applies/maintains**

*(Know the technical basis for, and be able to explain how, the product/device/circuit works).

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:

COMPETENCY: *Understand principles and operations of types of logic gates. (F.06)(Page 1 of 2)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
	Occupational Theory					
Tasks:					ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	**Resources: Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/ Facility:** Acquires, stores, uses materials efficiently; **Interpersonal:Team:** Participates as team; **teaches others; Leadership:**communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems;monitors/ corrects performance; improves;Technology: Selects/Applies/maintains**
1. List the three basic types of logic elements.			ACT Level 5 SCANS F1-D	ACT Level 4 SCANS F3		
2. Draw the schematic & explain the operation of both diode & switch contact OR gates.			SAME	SAME	SAME	
3. Draw the schematic & explain the operation of both diode & switch contact AND gates.			SAME	SAME	SAME	
4. Draw the schematic & explain the operation of a transistor & switch contact inverter.			SAME	SAME	SAME	
5. Given a list of symbols, identify the industry standard symbols for inverters, AND, OR, NAND, & NOR gates.			SAME	SAME	SAME	
6. From a list of truth tables, identify the logic functions being performed.			SAME	SAME	SAME	
			(EIF 056, 058, 059) (Listening 5 EIF 063; Writing 4 EIF 062; Speaking EIF 023)	EIF 068, 072, 073	EIF 076, 077, 078, 047, 044	

*(Know the technical basis for, and be able to explain how, the product/device/circuit works).

Occupation: Electronic Technician
Duty Area/Function:

Task Analysis Worksheet

COMPETENCY: ***Understand principles and operations of types of logic gates.** (F.06)(Page 2 of 2)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
	Occupational Theory					
Tasks: 7. Write a truth table for any of the basic logic functions: AND, OR, NOT, NAND, NOR.			ACT Level 5 SCANS F1-D	ACT Level 4 SCANS F3	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	**Resources: Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/ Facility:** Acquires, stores, uses materials efficiently; **Interpersonal:Team:** Participates as team; **teaches others; Leadership:**communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information:** Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems;monitors/ corrects performance; improves;Technology: Selects/Applies/maintains**
8. Given a list of logic equations, identify the logic function expressed by each.			SAME	SAME	SAME	
9. Write the logic equation for any of the basic logic functions AND, OR, NAND, NOR, NOT.			SAME	SAME	SAME	
10. Identify & explain the operation of exlusive OR gates.			SAME	SAME	SAME	
			(EIF 056, 058, 059) (Listening 5 EIF 063; Writing 4 EIF 062; Speaking EIF 023)	EIF 068, 072, 073	EIF 076, 077, 078, 047, 044	

*(Know the technical basis for, and be able to explain how, the product/device/circuit works).

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:

COMPETENCY: *Understand principles and operations of combinational logic circuits. (F.09)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
	Occupational Theory					
Tasks: 1. Write definition for combinational logic circuits.			ACT Level 5 SCANS F1-D	ACT Level 4 SCANS F3	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	**Resources: Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/ Facility:** Acquires, stores, uses materials efficiently; **Interpersonal: Team:** Participates as team; **teaches others; Leadership:** communicates ideas to justify position, persuades/ convinces; responsibly challenges; **Works with Diversity:** works with others; **Information:** Acquires, evaluates, organizes, maintains, interprets, communicates information; uses computer to process information **Systems: understands systems; monitors/ corrects performance; improves; Technology: Selects/Applies/maintains**
2. Write a definition for sequential logic circuits.			SAME	SAME	SAME	
3. Draw a schematic and explain the operation of different configurations of combinational logic circuits.			SAME (EIF 056, 058, 059) (Listening 5 EIF 063; Writing 4 EIF 062; Speaking EIF 023)	SAME EIF 068, 072, 073	SAME EIF 076, 077, 078, 047, 044	

*(Know the technical basis for, and be able to explain how, the product/device/circuit works).

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:

COMPETENCY: *Understand principles and operations of types of flip-flop circuits. (F.12)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
	Occupational Theory					
Tasks: 1. Define the term flip flops. 2. Describe the operation of different types of flip flops: D, JK, RS. 3. Develop truth tables for the various types of flip-flops. 4. Select the proper flip flops for a specific application.			ACT Level 5 SCANS F1-D SAME SAME SAME (EIF 056, 058, 059) (Listening 5 EIF 063; Writing 4 EIF 062; Speaking EIF 023)	ACT Level 4 SCANS F3 SAME SAME SAME EIF 068, 072, 073	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All SAME SAME SAME EIF 076, 077, 078, 047, 044	Resources: Time: Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/ Facility:** Acquires, stores, uses materials efficiently; Interpersonal: Team: Participates as team; **teaches others; Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; Information: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information Systems: **understands systems;monitors/ corrects performance; improves;**Technology: **Selects/Applies/maintains**

*(Know the technical basis for, and be able to explain how, the product/device/circuit works).

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Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:

COMPETENCY: *Understand principles and operations of types of registers and counters. (F.15)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
	Occupational Theory					
Tasks: 1. Discuss the operations of registers & counters.			ACT Level 5 SCANS F1-D	ACT Level 4 SCANS F3	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	**Resources: Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/ Facility:** Acquires, stores, uses materials efficiently; **Interpersonal:Team:** Participates as team; **teaches others; Leadership:**communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information:** Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computerto process information **Systems: understands systems;monitors/ corrects performance; improves;Technology: Selects/Applies/maintains**
2. List some specific applications for registers & counters in digital circuits.			SAME	SAME	SAME	
3. Discuss registers as used for serial in/parallel out, serial in/serial out and bidirectional.			SAME	SAME	SAME	
4. Discuss shift registers made from flop flops.			SAME	SAME	SAME	
5. Discuss asynchronous & synchronous counters connected from basic flop-flops.			SAME	SAME	SAME	
6. Discuss the sue of counters as frequency dividers.			SAME	SAME	SAME	
7. Show logic for counter decoding.			SAME	SAME	SAME	
8. Calculate tuning limitations on synchronous/asynchronous counters.			SAME	SAME	SAME	
9. Discuss truth tables for registers & counters.			SAME	SAME	SAME	

*(Know the technical basis for, and be able to explain how, the product/device/circuit works).

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function:

COMPETENCY: *Understand principles and operations of clock and timing circuits. (F.18)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
	Occupational Theory					
Tasks:						

*(Know the technical basis for, and be able to explain how, the product/device/circuit works).

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function: Maintenance/Installation/Repair/Evaluation/Troubleshooter

Competency: *Understand principles and operations of types of arithmetic-logic circuits. (F.21)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/skills required)
	Occupational Theory					
Tasks: 1. Analyze truth tables and timing diagrams of sum-of-products circuits.		1.Data and reference manuals.	ACT Level 5 SCANS F1-b	ACT Level 5 SCANS F3 & F4	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	**Resources: Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/ Facility:** Acquires, stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/ corrects performance; improves;Technology: Selects/ Applies/ maintains**
2. Analyze truth tables and timing diagrams of product-of-sum circuits.			SAME (Listening EIF 063; Speaking EIF 023,027; Writing EIF 062)	SAME (EIF 066,067,069,069 072,073,074,075,076,077,078,082,084,085,086,087,089,090)	SAME (EIF 043,044,045, 047,050)	

*(Know the technical basis for, and be able to explain how, the product/device/circuit works).

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function: Maintenance/Installation/Repair/Evaluation/Troubleshooter

Competancy: *Understand principles and operations of types of multiplexer and demultiplexer circuits. (F.24)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/skills required)
	Occupational Theory					
Tasks: 1. Analyze truth tables and timing diagrams of multiplexer circuits. 2. Analyze truth tables and timing diagrams of demultiplexer circuits.		1.Digital Trainer 2.Discrete relevant electronic components. 3.Multimeters 4.Oscilloscopes 5.Logic Probes 6.Logic Analyzer 7.Hand tools 8.Anti-static equipment 9. Data book	ACT Level 5 SCANS F1-b SAME (Listening EIF 063; Speaking EIF 023,027; Writing EIF 062)	ACT Level 5 SCANS F3 & F4 (EIF 066,067,069,069 072,073,074,075,076,077,078,082,084,085,086,087,089,090)	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All (EIF 043,044,045, 047,050)	**Resources: Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/ Facility:** Acquires, stores, uses materials efficiently; **Interpersonal: Team:** Participates as team; **teaches others; Leadership:**communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/ corrects performance; improves;Technology: Selects/ Applies/ maintains**

*(Know the technical basis for, and be able to explain how, the product/device/circuit works).

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function: Maintenance/Installation/Repair/Evaluation/Troubleshooter

Competency: *Understand principles and operations of types of digital to analog and analog to digital circuits. (F.27)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
	Occupational Theory					
Tasks: 1. Analyze truth tables and timing diagrams of digital to analog converter circuits. 2. Analyze truth tables and timing diagrams of analog to digital circuits.		1.Digital Trainer 2.Discrete relevant electronic components. 3.Multimeters 4.Oscilloscopes 5.Logic Probes 6.Logic Analyzer 7.Hand tools 8.Anti-static equipment 9. Data book	ACT Level 5 SCANS F1-b Listening EIF 063 Speaking EIF 023,027 Writing EIF 062	ACT Level 5 SCANS F3 & F4 EIF 066,067,069,069 072,073,074,075,076,077,078,082,084,085,086,087,089,090 Level 5	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: EIF 043,044,045, 047,050	Resources: **Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/ Facility:** Acquires, stores, uses materials efficiently; Interpersonal: **Team:** Participates as team; **teaches others; Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; Information: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/ corrects performance; improves;Technology: Selects/ Applies/ maintains**

*(Know the technical basis for, and be able to explain how, the product/device/circuit works).

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function: Maintenance/Installation/Repair/Evaluation/Troubleshooter

Competency: *Understand principles and operations of types of digital display circuits. (F.30)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, infor mation, interpersonal and systems competencies/ skills required)
	Occupational Theory					
Tasks: 1. Analyze truth tables and timing diagrams of decoder driver circuits.		1.Digital Trainer 2.Discrete relevant electronic components. 3.Multimeters 4.Oscilloscopes 5.Logic Probes 6.Logic Analyzer 7.Hand tools 8.Anti-static equipment 9. Data book	ACT Level 5 SCANS F1-b	ACT Level 5 SCANS F3 & F4	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	**Resources**: **Time**: Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/ Facility**: Acquires, stores, uses materials efficiently; **Interpersonal:** **Team**: Participates as team; **teaches others; Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity**: works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/ corrects performance; improves;Technology: Selects/ Applies/ maintains**
2. Analyze truth tables and timing diagrams of counter circuits.			SAME	SAME	SAME	
3. Analyze segment display circuits.			SAME	SAME	SAME	
			(Listening EIF 063; Speaking EIF 023,027; Writing EIF 062)	(EIF 066,067,069,069 072,073,074,075,076,077,078,082,084,085,086,087,089,090)	(EIF 043,044,045, 047,050)	

*(Know the technical basis for, and be able to explain how, the product/device/circuit works).

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function: Maintenance/Installation/Repair/Evaluation/Troubleshooter/Administration

Competency: *Understand principles and operations of digital power distribution and noise problems. (F.33)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
	Occupational Theory					
Tasks: 1. Analyze propagation delay of logic circuits.		1.Digital Trainer 2.Discrete relevant electronic components. 3.Multimeters 4.Oscilloscopes 5.Logic Probes 6.Logic Analyzer 7.Hand tools 8.Anti static equipment 9. Data book	ACT Level 5 SCANS F1-b	ACT Level 5 SCANS F3 & F4	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	
2. Analyze power dissipation of logic circuits.			SAME	SAME	SAME	
3. Analyze Speed Power trade off in logic circuits.			SAME	SAME	SAME	
4. Analyze noise immunity as percentage of supply voltage on digital circuits.			SAME	SAME	SAME	
5. Analyze fan out of logic circuits.			SAME	SAME	SAME	
			(Listening EIF 063; Speaking EIF 023,027; Writing EIF 062)	(EIF 066,067,068,069 072,073,074,075,076,077,078,082,084,085,086,087,089,090)	(EIF 043,044,045, 047,050)	

*(Know the technical basis for, and be able to explain how, the product/device/circuit works).

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function: Maintenance/Installation/Repair/Evaluation/Troubleshooter

Competency: *Understand principles and operations of types of digital encoders and decoders. (F.36)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/skills required)
	Occupational Theory					
Tasks: 1. Analyze BCD to Decimal decoders circuits.		1.Digital Trainer 2.Discrete relevant electronic components. 3.Multimeters 4.Oscilloscopes 5.Logic Probes 6.Logic Analyzer 7.Hand tools 8.Anti-static equipment 9. Data book	ACT Level 5 SCANS F1-b	ACT Level 5 SCANS F3 & F4	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	**Resources: Time:** Selects goal relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/ Facility:** Acquires, stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/ corrects performance; improves;Technology: Selects/ Applies/ maintains**
2. Analyze Octal decoders circuits.			SAME	SAME	SAME	
3. Analyze Hex decoders circuits.			SAME	SAME	SAME	
4. Analyze BCD to 7-Segment decoder circuits.			SAME	SAME	SAME	
5. Analyze simple encoder circuits.			SAME	SAME	SAME	
6. Analyze Decimal to BAD encoder circuits.			SAME	SAME	SAME	
7. Analyze 8-input priority encoder circuits.			SAME	SAME	SAME	
			(Listening EIF 063; Speaking EIF 023,027; Writing EIF 062)	(EIF 066,067,069,069 072,073,074,075,076,077,078,082,084,085,086,087,089,090)	(EIF 043,044,045, 047,050)	

*(Know the technical basis for, and be able to explain how, the product/device/circuit works).

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function: Maintenance/Installation/Repair/Evaluation/Troubleshooter

Competency: *Understand principles and operations of digital display devices. (F.39)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/skills required)
	Occupational Theory					
Tasks: 1. Analyze BCD to Decimal decoders circuits.		1.Digital Trainer 2.Discrete relevant electronic components. 3.Multimeters 4.Oscilloscopes 5.Logic Probes 6.Logic Analyzer 7.Hand tools 8.Anti-static equipment 9. Data book	ACT Level 5 SCANS F1-b	ACT Level 5 SCANS F3 & F4	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	**Resources: Time**: Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/ Facility:** Acquires, stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/ corrects performance; improves;Technology: Selects/ Applies/ maintains**
2. Analyze Octal decoders circuits.			SAME	SAME	SAME	
3. Analyze Hex decoders circuits.			SAME	SAME	SAME	
4. Analyze BCD to 7 Segment decoder circuits.			SAME	SAME	SAME	
5. Analyze simple encoder circuits.			SAME	SAME	SAME	
6. Analyze Decimal to BAD encoder circuits.			SAME	SAME	SAME	
7. Analyze 8 input priority encoder circuits.			SAME	SAME	SAME	
			(Listening EIF 063; Speaking EIF 023,027; Writing EIF 062)	(EIF 066,067,069,069 072,073,074,075,076,077,078,082,084,085,086,087,089,090)	(EIF 043,044,045, 047,050)	

*(Know the technical basis for the workings of a product/device/circuit/procedure and be able to demonstrate that knowledge.)

MICROPROCESSORS

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function: Evaluate/Troubleshooting/Repair

Competency: *Demonstrate an understanding of microprocessor peripherals and their interfaces. (G.01)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
Performance Skills	Occupational Theory					
Steps 1. Build and analyze a microprocessor memory interface.		1. Microprocessor Trainer 2. Discrete relevent electronic components. 3. Multimeters 4. Oscilloscopes 5. Logic Probes 6. Login Analyzer 7. Hand tools 8. Anti-static equipment 9. Data book	ACT Level 5 SCANS F1-b	ACT Level 5 SCANS F3 & F4	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	**Resources:** **Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/ Facility:** Acquires, stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership:**communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems****: understands systems; monitors/ corrects**
2. Analyze a microprocessor buss controller.			SAME	SAME	SAME	
3. Analyze a microprocessor interupt controller.			SAME	SAME	SAME	
4. Build, analyze and program a Programmable Parrallel Interface (PPI).			SAME	SAME	SAME	
5. Build and analyze a sync/async serial interface.			SAME	SAME	SAME	
			(Listening EIF 063; Speaking EIF 023,027; Writing EIF 062)	(EIF 073,066)	(EIF 044,EIF047)	

*(Know the technical basis for the workings of a product/device/circuit/procedure and be able to demonstrate that knowledge.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function: Evaluate/Troubleshooting/Repair

Competency: *Demonstrate an understanding of troubleshooting and repair of microprocessor peripheral interfaces. (G.02)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
	Occupational Theory					
EIF027,EIF028,EIF029,EIF030,EIF031, EIF032,EIF033		EIF02,EIF08 EIF022,EIF018,EIF017,EIF015,EIF019 Data book	ACT Level 5 SCANS F1-b (Listening EIF 063; Speaking EIF 023,027; Writing EIF 062)	ACT Level 5 SCANS F3 & F4 (EIF 073,066)	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All (EIF 044,EIF047)	**Resources: Time**: Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/ Facility:** Acquires, stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/ corrects**

*(Know the technical basis for the workings of a product/device/circuit/procedure and be able to demonstrate that knowledge.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function: Repair/Evaluation/Troubleshooting/Installation

Competency: *Demonstrate an understanding of types of microprocessor peripherals. (G.3)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
	Occupational Theory					
Tasks: 1. Build and analyze a microprocessor memory interface.		EIF02,EIF08 EIF022,EIF018,EIF017,EIF015,EIF019 Data book	ACT Level 5 SCANS F1 b	ACT Level 5 SCANS F3 & F4	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	**Resources: Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/ Facility:** Acquires, stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership:** communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information:** Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/ corrects**
2. Analyze a microprocessor buss controller.			SAME	SAME		
3. Analyze a microprocessor interupt controller.			SAME	SAME	SAME	
4. Build, analyze and program a Programmable Parrallel Interface (PPI).			SAME	SAME	SAME	
5. Build and analyze a sync/async serial interface.			SAME	SAME	SAME	
			(Listening EIF 063; Speaking EIF 023,027; Writing EIF 06)2	(EIF 073,066)	(EIF 044,EIF 047)	

*(Know the technical basis for the workings of a product/device/circuit/procedure and be able to demonstrate that knowledge.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function: Evauation/Troubleshooting

Competency: *Demonstrate an understanding of essential microprocessor components. (G.04)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
	Occupational Theory					
Tasks: Write, assemble, execute and debug machine language programs involving use of ALU, Data and Index registers, Segment registers and internal busses.		Logic Probes Multimeters Oscilloscopes Data Book	ACT Level 5 SCANS F1-b (Listening EIF 063; Speaking EIF 023,027; Writing EIF 062)	ACT Level 5 SCANS F3 & F4 (EIF 073,066)	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All (EIF 044,EIF 047)	**Resources: Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/ Facility:** Acquires, stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/ corrects performance; improves;Technology: Selects/ Applies/ maintains**

*(Know the technical basis for the workings of a product/device/circuit/procedure and be able to demonstrate that knowledge.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function: Evaluation/troubleshooting/installation/repair

Task: *Demonstrate an understanding of the use of a microcomputer operating system. (G.06)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
	Occupational Theory					
Tasks: 1. Write arithmetic functions. 2. Analyze booting sequence. 3. Generate time and date codes for files. 4. Low and High level Format diskettes and hard drives. 5. Perform sector and track analysis. 6. Using DOS service routines. 7. Troubleshoot bugs and viruses on operating system.		1. Microcomputer. 2. Appropriate OS and diagnostic software. 3. Anti-virus software.	ACT Level 5 SCANS F1-b SAME SAME SAME SAME SAME SAME (Listening EIF 063; Speaking EIF 023,027; Writing EIF 062)	ACT Level 4 SCANS F3 & F4 SAME SAME SAME SAME SAME (EIF 073,066 Level 4)	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All SAME SAME SAME SAME SAME (EIF 044,EIF 047)	**Resources: Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/ Facility:** Acquires, stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership**:communicates ideas to justify position, persuades/ convinces;responsibly challenges; **Works with Diversity:** works with others; **Information**: Acquires, evaluates, organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/ corrects performance; improves;Technology: Selects/ Applies/ maintains**

*(Know the technical basis for the workings of a product/device/circuit/procedure and be able to demonstrate that knowledge.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function: Evaluation/troubleshooting/installation/repair

Competency: ***Demonstrate an understanding of microprocessor BUS concepts. (G.06)**

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/skills required)
	Occupational Theory					
Tasks: 1. Build and analyze timing bus sequences.		1.Micropro Trainer 2.Discrete relevant electronic components. 3.Multimeters 4.Oscilloscopes 5.Logic Probes 6.Logic Analyzer 7.Hand tools 8.Anti-static equipment 9. Data book	ACT Level 5 SCANS F1-b	ACT Level 5 SCANS F3 & F4	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	**Resources: Time:** Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule; **Material/ Facility:** Acquires, stores, uses materials efficiently; **Interpersonal:** **Team:** Participates as team; **teaches others; Leadership:** communicates ideas to justify position, persuades/ convinces; responsibly challenges; **Works with Diversity:** works with others; **Information:** Acquires, evaluates, organizes, maintains, interprets, communicates information; uses computer to process information **Systems: understands systems; monitors/ corrects performance; improves; Technology: Selects/ Applies/ maintains**
2. Build and analyze data and address bus controllers circuits.			SAME	SAME	SAME	
3. Build and analyze interrupt controllers circuits.			SAME	SAME	SAME	
4. Build and analyze clock and timing generation circuits.			SAME	SAME	SAME	
			(Listening EIF 063; Speaking EIF 023,027; Writing EIF 062)	(EIF 073,086)	(EIF 044,EIF 047)	

*(Know the technical basis for the workings of a product/device/circuit/procedure and be able to demonstrate that knowledge.)

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Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function: Evaluation/troubleshooting/installation/repair

Competency: *Demonstrate an understanding of microprocessor components and terminology (CPU, AU, Device Driver, ROM, RAM, EPROM, etc.) (G.07)(Page 1 of 2)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/skills required)
	Occupational Theory					
Tasks: 1. Build and analyze a microprocessor memory interface.		1.Micropro Trainer 2.Discrete relevant electronic components. 3.Multimeters 4.Oscilloscopes 5.Logic Probes 6.Logic Analyzer 7.Hand tools 8.Anti-static equipment 9.Wordprocessing and schematic editor software 9. Data book	ACT Level 5 SCANS F1-b	ACT Level 5 SCANS F3 & F4	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All	**Resources**: **Time**: Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule;**Material/ Facility:** Acquires, stores, uses materials efficiently; **Interpersonal:****Team**: Participates as team; **teaches others; Leadership**:communicates ideas to justify position,persuades/ convinces; responsibly challenges; **Works with Diversity:** works with others; **Information**:Acquires, evaluates,organizes, maintains, interprets, communicates information;uses computer to process information **Systems:** **understands systems; monitors/corrects performance; improves;****Technology:** **Selects/Applies/ maintains**
2. Analyze a microprocessor buss controller.			SAME	SAME		
3. Analyze a microprocessor interrupt controller.			SAME	SAME		
4. Build, analyze and program a Programmable Parallel Interface (PPI).			SAME	SAME		
5. Build and analyze a sync/async serial interface.			SAME	SAME		
6. Build and analyze timing bus sequences.			SAME	SAME		
7. Build and analyze data and address bus controllers circuits.			SAME	SAME		
8. Build and analyze interrupt controllers circuits.			SAME (Listening EIF 063; Speaking EIF 023,027; Writing EIF 062)	SAME EIF 073,068 Level 5	(EIF 044,EIF 047)	

*(Know the technical basis for the workings of a product/device/circuit/procedure and be able to demonstrate that knowledge.)

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Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function: Evaluation/troubleshooting/installation/repair

Competency: *Demonstrate an understanding of microprocessor components and terminology (CPU, AU, Device Driver, ROM, RAM, EPROM, etc.) (G.07)(Page 2 of 2)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, infor mation, interpersonal and systems competencies/ skills required)
	Occupational Theory					
(continued) 9. Build and analyze clock and timing generation circuits. 10. Report and record keeping on all experimentation and project building. 11. Summarization and essay writing on microprocessor and microprocessor related components.		SAME	SAME	SAME	SAME	SAME

*(Know the technical basis for the workings of a product/device/circuit/procedure and be able to demonstrate that knowledge.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function: Evaluation/troubleshooting/installation/repair

Competency: *Understand principles and operations of types of microprocessor memory circuits. (G.08)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/skills required)
	Occupational Theory					
Tasks: 1. Formulate and use different read/ write ROM addressing schemes 2. Formulate and use different read/ write DRAM and SRAM addressing schemes 3. Formulate and use different read\ write EPROM addressing schemes 4. Formulate and use DMA addressing schemes		1.Micropro Trainer 2.logic Probes 3.Logic Analyzer 4.Hand tools 5.Anti static equipment 6.Wordprocessing and schematic editor software 7. Data book 8. PROM burner	ACT Level 5 SCANS F1-b SAME SAME SAME (Listening EIF 063; Speaking EIF 023,027; Writing EIF 062)	ACT Level 5 SCANS F3 & F4 SAME SAME SAME (EIF 073,066)	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All SAME SAME SAME (EIF 044,EIF 047)	Resources: Time: Selects goal relevant activities; ranks goals; allocates time; Prepares & follows schedule;**Material/ Facility:** Acquires, stores, uses materials efficiently; Interpersonal:Team: Participates as team; **teaches others; Leadership**:communicates ideas to justify position,persuades/ convinces; responsibly challenges; **Works with Diversity**: works with others; Information:Acquires, evaluates,organizes, maintains, interprets, communicates information;uses computer to process information Systems: **understands systems; monitors/corrects performance; improves;**Technology: **Selects/Applies/ maintains**

*(Know the technical basis for, and be able to explain how, the product/device/circuit works).

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function: Evaluation/troubleshooting/repair

Competency: *Understand principles and operations of Microprocessor machine code and instruction sets. (G.11)

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, interpersonal and systems competencies/ skills required)
	Occupational Theory					
Tasks: 1. Using DEBUG/MASM design, write and debug machine language programs on MC6800 microprocessor. 2. Using DEBUG/MASM design, write and debug machine language programs on 8088 microprocessor.		1. Microcomputer 2. Microprocessor trainer	ACT Level 5 SCANS F1-b SAME (Listening EIF 063; Speaking EIF 023,027; Writing EIF 062)	ACT Level 5 SCANS F3 & F4 SAME (EIF 066,067,069 072,073,074 075,076,084 090)	ACT Level 5 SCANS: Thinking Skills: All Personal Qualities: All SAME (EIF 043,EIF 044 EIF 047,EIF 050)	**Resources:** Time: Selects goal-relevant activities; ranks goals; allocates time; Prepares & follows schedule;**Material/ Facility:** Acquires, stores, uses materials efficiently; **Interpersonal:** Team: Participates as team; **teaches others; Leadership**:communicates ideas to justify position,persuades/ convinces; responsibly challenges; **Works with Diversity:** works with others; **Information:** Acquires, evaluates,organizes, maintains, interprets, communicates information;uses computer to process information **Systems: understands systems; monitors/corrects performance; improves;Technology: Selects/Applies/ maintains**

*(Know the technical basis for, and be able to explain how, the product/device/circuit works).

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function: All

COMPETENCY: Understand the principles of communications Systems.

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, inter personal and systems competencies/ skills required)
	Occupational Theory					
Tasks: 1. RF system safety 2. Transmission line applications 3. Antenna systems 4. Radio transmitters and receivers 5. Types of multiplexing systems 6. Data communications 7. Fiber optic communication systems 8. Types of telephone switching systems 9. Microwave communications systems						

*Have an overview perspective of the principles/concepts or the workings of a product/device/circuit/system.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function: All

COMPETENCY: Understand the principles of product servicing.

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, inter personal and systems competencies/ skills required)
	Occupational Theory					
Tasks: 1. Surface mount devices 2. Radio and TV receiving systems 3. Analog and digital video recording and playback systems 4. Laser disk systems 5. Home electronics systems a. Home automation b. FAX machines c. Computer games d. Personal telephones e. Electronic security f. Telephone systems 6. Analog and digital audio systems 7. Microwave ovens 8. CATV/SATV antenna systems 9. Photocopier systems 10. LASER printing 11. CCITT standards						

*Have an overview perspective of the principles/concepts or the workings of a product/device/circuit/system.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function: All

COMPETENCY: Understand the principles of Computer/Microcomputer Servicing.

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, inter personal and systems competencies/ skills required)
	Occupational Theory					
Tasks: 1. Computer/microcomputer systems architecture 2. Computer programming fundamentals 3. Computer/microcomputer operating systems 4. Computer/microcomputer applications software 5. Computer/microcomputer networking 6. Computer/microcomputer processor/coprocessor circuits 7. Computer communications interfacing 8. Peripheral equipment 9. Display terminals and interface controllers 10. Printers and interface controllers 11. Magnetic tape equipment and interface controllers 12. Disk storage equipment and interface controllers 13. CD ROM equipment and interface controllers 14. Cabling interconnects						

*Have an overview perspective of the principles/concepts or the workings of a product/device/circuit/system.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function: All

COMPETENCY: Understand the principles of Electromechanical.

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)*	SCANS Competencies (List resources, information, inter personal and systems competencies/ skills required)
	Occupational Theory					
Tasks: 1. Electronic and mechanical blueprint reading 2. Motors and motor control circuits a. Power distribution systems b. Relays and relay circuits c. Protection circuits d. Types of motor controllers e. Types of motors 3. Hydraulic and pneumatic systems 4. Mechanical power transmission systems a. Measuring instruments b. Compound and reverted gear trains c. Internal and planetary gear trains d. Helical and bevel gear trains e. Rack and pinion mechanisms f. Worm and wheel mechanisms g. Block and screw mechanisms						

*Have an overview perspective of the principles/concepts or the workings of a product/device/circuit/system.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function: All

COMPETENCY: Understand the principles of Electromechanical (continued).

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, inter personal and systems competencies/ skills required)
	Occupational Theory					
Tasks: 4. h. Counter rotating mechanisms and differentials, etc. 5. Vacuum status 6. Mechanisms, linkages and levers 7. Transducers and instrumentation 8. Industrial materials 9. Automatic controls and robotics						

*Have an [illegible]view perspective of the principles/concepts or the workings of a product/device/circuit/system.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function: All

COMPETENCY: Understand the principles of LASER Application.

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, inter personal and systems competencies/ skills required)
	Occupational Theory					
Tasks: 1. Welding, cutting and drilling 2. Data recording and manipulation 3. Environmental testing and monitoring 4. Nondistinctive testing 5. Measurement 6. Communications 7. Fiber optics and lasers 8. Lasers in medicine 9. Holography/interferometry						

*Have an overview perspective of the principles/concepts or the workings of a product/device/circuit/system.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function: All

COMPETENCY: Understand the principles of Biomedical Systems.

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, inter personal and systems competencies/ skills required)
	Occupational Theory					
Tasks: 1. Electrical safety analyzer and its use 2. Medical specialty test equipment and their uses 3. Defibrillator analyzer and its use 4. Floor conductivity checker and its use 5. Mercury manometers/uses 6. EKG simulator and its use 7. Photo tachometer/its use 8. Ultrasound watt meter/its use 9. Biomedical industry specific codes and regulations 10.Chemical safety 11.Medical gas/pressure safety 12.Infectious disease safety 13.Thermal safety 14.Radiation safety 15.Medical equipment operational procedures and clinical applications 16.Thermistor control circuits 17.Crystal oscillators 18.Hartley oscillator 19.Anatomy and physiology 20.Medical terminology						

*Have an overview perspective of the principles/concepts or the workings of a product/device/circuit/system.)

Task Analysis Worksheet

Occupation: Electronic Technician
Duty Area/Function: All

COMPETENCY: Understand the principles of Automotive Service.

Technology		Tools, Equipment Materials Used	Communication Skills (List Reading, Listening, Speaking, Writing Skills used and level required)	Math Skill (List math skills used and level required)	Reasoning Skills (List creative, decision and problem solving skills used)	SCANS Competencies (List resources, information, inter personal and systems competencies/ skills required)
	Occupational Theory					
Tasks: 1. On board self diagnostic systems 2. Driveability problems and relation to faults 3. Engine control problems and faults a. Insufficient or no spark b. Cylinder misfire 4. System specific diagnostic tests a. Ignition system b. Battery/starting/charging system c. Transmission control system d. Anti-lock brake control system e. Suspension and steering control systems f. HVAC electronic control systems h. Lighting systems i. Instrumentation and gauges j. Body electrical systems						

*Have an overview perspective of the principles/concepts or the workings of a product/device/circuit/system.)

TABLE H

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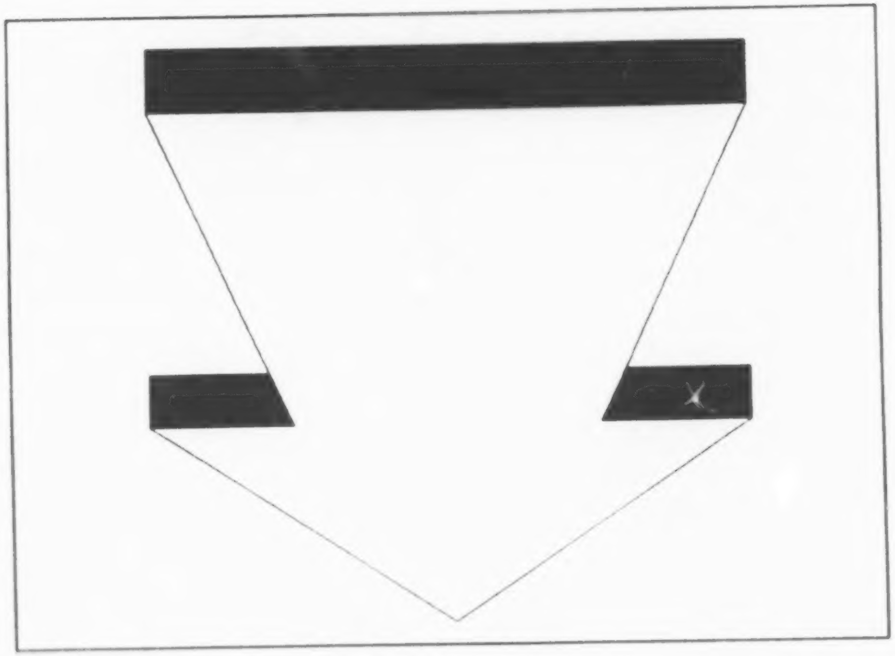
BASIC AND PRACTICAL SKILLS



BASIC AND PRACTICAL SKILLS

Skill Descriptors

•Demonstrate ________________

(Show the capability to perform a process or exhibit a behavior)

Work Ethics and Behavior

01 Implement responsibilities of job position including exhibiting dependability, and following the chain of command
02 Follow rules, regulations and policies as established including interpreting employer/employee handbook/procedure
03 Practice cost effectiveness
04 Practice time management and follow work schedule
05 Assume responsibility for own decisions and actions
06 Exhibit pride
07 Initiative
08 Assertiveness
09 Demonstrate willingness to learn
010 Seek work challenges
011 Maintain regular attendance
012 Apply ethical reasoning to decisionmaking

Technical Literacy

013 Basic keyboarding skills
014 Computer skills
  a. Word processing
  b. Data base
  c. Spreadsheet
  d. Sketching application
  e. Windowing applications
015 Recognize impact of technological changes on tasks and people including:
  Participating in service training
  Maintain state-of-the-art skills
  Update skills
  Participate in continuing education
  Diversify education experience
016 Understand and apply Total Quality Management principles

BASIC AND PRACTICAL SKILLS

Skill Descriptors

Interpersonal Relationships

017 Respond constructively to praise or criticism
018 Provide constructive praise or criticism
019 Channel/control emotional reactions constructively
020 Resolve conflicts
021 Display a positive attitude
022 Sensitivity to customer needs

Communicating on the Job

023 Use correct grammar
024 Write legibly
025 Use telephone etiquette including relaying messages orally and in writing
026 Employ listening skills including listening attentively to supervisors, coworkers and customers
027 Interpret written, graphic and oral instructions
028 Employ non-verbal communication
029 Interact with customer on component/system functioning in a logical, clear and understandable manner
030 Conduct in-service training for customers
031 Communicate equipment status and operations to customer
032 Communicate work status to supervisors
033 Communicate with co-workers

Maintaining Professionalism

034 Demonstrate knowledge of your business products/services
035 Exhibit positive behavior including using courtesy and respecting other workers' jobs
036 Comply with company standards concerning dress and appearance including demonstrating personal hygiene and cleanliness, and wearing attire suitable to the work place
037 Participate in meetings in a positive and constructive manner
038 Comply with organizational expectations
039 Use job-related terminology
040 Treat people with respect
041 Learn new concepts and technology through self study and lifelong learning

BASIC AND PRACTICAL SKILLS

Skill Descriptors

Solving Problems and Critical Thinking

042 Identify the problem including assessing values and norms, and identifying attitudes, beliefs and responsibilities
043 Clarify purposes and goals
044 Identify available solutions and their impact including evaluating credibility of information, and locating information
045 Evaluate options
046 Set priorities
047 Select/implement options/decisions including predicting results of proposed action
048 Organize workloads
049 Assess employer/employee responsibility in solving a problem
050 Generate new ideas and solve problems using brainstorming techniques

Team Work

051 Identify style of leadership required for effective team work
052 Establish team's operating procedures including:
 Identifying group tasks
 Matching members and group tasks
 Setting time frame to accomplish tasks
 Demonstrating negotiating and conflict management skills
053 Work productively with others
054 Complete a team task including:
 Sharing information, ideas and options with others
 Demonstrating procedures and assisting others
 Coming to closure
055 Evaluate outcome

Basic Foundation Skills

Reading
056 Manufacturers literature
057 Codes and regulations
058 Charts and graphs
059 Schematic diagrams
060 Flow diagrams

BASIC AND PRACTICAL SKILLS

Skill Descriptors

Writing

061 Technical reports, letters and memoranda to:
  a. Supervisors
  b. Manufacturers
  c. Customers
  d. Co-workers
062 Document lab projects, procedures, test logs and equipment failure reports

Listening

063 Listens attentively
064 Assess signs and symptoms of malfunctions
065 Listening to customers

Proficiency in Mathematics

Numbers and Number Relations

066 Round and/or truncate numbers to designated place value
067 Compute and solve problems involving integers, fractions, decimals, and percentages using order of operations
068 Compare order and determine equivalences of real numbers (e.g., fractions, decimals, percentages)
069 Estimate, apply, and solve problems involving fractions, decimals, percentages, and real numbers
070 Set up,solve, and apply ratios and proportions
071 Solve problems and make applications involving integers, fractions, decimals, percentages, ratios, and proportions
072 Translate written and/or verbal statements into mathematical expressions
073 Compare, compute, and solve problems involving binary, octal, decimal, and hexadecimal numbering systems

BASIC AND PRACTICAL SKILLS

Skill Descriptors

Measurement

074 Convert, compare, and compute with common units of measurement within and/or across measurement systems
075 Read scale on measurement device(s) to nearest mark and make interpolations where appropriate

Data Analysis and Probability

076 Interpret and use tables, charts, maps, and/or graphs
077 Identify patterns, note trends, and/or draw conclusions from tables, charts, maps, and/or graphs
078 Collect and organize data into tables, charts, and/or graphs
079 Compute and interpret mean, median, and/or mode
080 Understand process control techniques and statistical terms and charts needed for interpretation of Total Quality Management operation

Algebra

081 Evaluate and/or simplify algebraic expressing using simple substitutions
082 Solve linear equations
083 Use order of operations to solve problems
084 Use formulas
085 Compare and compute using scientific notation
086 Use properties of exponents
087 Select and use appropriate problem-solving techniques
088 Determine slope, midpoint and distance
089 Graph functions
090 Use Boolean algebra

Geometry

091 Find perimeters and areas of geometric figures
092 Find surface areas and volumes of applicable geometric figures
093 Recognize, classify, and use properties of lines and angles
094 Recognize, classify, and use properties of two- and three- dimensional figures (e.g., circles, triangles, rectangles, cylinders)
095 Apply Pythagorean theorem

BASIC AND PRACTICAL SKILLS

Skill Descriptors

Trigonometry

096 Identify basic functions of sine, cosine, and tangent
097 Compute and solve problems using basic trigonometric functions
098 Graph basic functions using polar and/or Cartesian coordinate systems